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United States
Department of
Agriculture

Natural
Resources
Conservation
Service

Washington Basin Outlook Report January 1, 1999

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Issued by

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The Following Organizations Cooperate with the Natural Resources Conservation Service in Snow Survey Work*:

Canada	Ministry of the Environment Investigations Branch, Victoria, British Columbia
State	Washington State Department of Ecology Washington State Department of Natural Resources
Federal	Department of the Army Corps of Engineers U.S. Department of Agriculture Forest Service U.S. Department of Commerce NOAA, National Weather Service U.S. Department of Interior Bonneville Power Administration Bureau of Reclamation Geological Survey National Park Service Bureau of Indian Affairs
Local	City of Tacoma City of Seattle Chelan County P.U.D. Pacific Power and Light Company Puget Sound Power and Light Company Washington Water Power Company Snohomish County P.U.D. Colville Confederated Tribes Spokane County Yakama Indian Nation Whatcom County Pierce County
Private	Okanogan Irrigation District Wenatchee Heights Irrigation District Newman Lake Homeowners Association Whitestone Reclamation District

*Other organizations and individuals furnish valuable information for the snow survey reports. Their cooperation is gratefully acknowledged.

Washington Water Supply Outlook

January 1999

General Outlook

Washington started off the water-year kind of slow with below normal precipitation during October. Those deficiencies were more than made up for in November and December. Heavy mountain snow fall and record precipitation during December helped the state welcome the New Year in healthy climatological fashion. Minor flooding occurred on some Western Washington streams during the post-Christmas thaw. Major problems were possibly averted due to cooler and dryer conditions at the very end of the month.

Snowpack

The January 1 statewide SNOTEL readings were much above average at 144%. The Green River Basin snow surveys reported the lowest readings at 97% of average. Reading in the Olympic Peninsula and Stemilt Creek near Wenatchee reported the highest at 187% of average. Westside averages from SNOTEL, and January 1 snow surveys, included the North Puget Sound river basins with 150% of average, the Central Puget river basins with 129%, and the Lewis-Cowlitz basins with 158% of average. Snowpack along the east slopes of the Cascade Mountains included the Yakima area with 144% and the Wenatchee area with 180%. Snowpack in the Spokane River Basin was at 116% and the Pend Oreille River Basin, including Canadian data, had 127% of average. Maximum snow cover in Washington was at Paradise Park SNOTEL near Mount Rainer, with a water content of 40.7 inches. This site would normally have 23.6 inches of water content on January 1. Last year at this time Paradise Park had 21.5 inches of snow water. The highest average in the state was Pope Ridge SNOTEL in the Entiat River Basin with 298% of average.

BASIN	PERCENT OF LAST YEAR	PERCENT OF AVERAGE
Spokane	200	116
Newman Lake	191	151
Pend Oreille	190	127
Okanogan	169	127
Methow	191	171
Similkameen	219	155
Wenatchee	200	160
Chelan	166	155
Stemilt Creek	184	187
Yakima	202	163
Ahtanum Creek	230	126
Walla Walla	249	160
Lower Snake	179	134
Cowlitz	200	164
Lewis	215	153
White	156	154
Green	129	97
Puyallup	156	154
Cedar	193	159
Snoqualmie	177	124
Skykomish	187	135
Skagit	170	166
Baker	N/A	N/A
Nooksack	219	135
Olympic Peninsula	301	187

Precipitation

During the month of December, the National Weather Service and Natural Resources Conservation Service climate stations showed well above average precipitation for all river basins in Washington. The highest percent of average in the state was at Fish Lake SNOTEL. Fish Lake reported 274% of average for a total of 22 inches. The average for this site is 8 inches for December. Averages for the water year varied from 159% of average in the Central Puget Sound Basin to 121% of average in the Walla Walla river basins. The highest individual site average for the water year was 258% of average at Thunder Basin SNOTEL site in the North Cascade Mountains.

RIVER BASIN	DECEMBER PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	136	123
Colville-Pend Oreille	133	126
Okanogan-Methow	150	133
Wenatchee-Chelan	171	146
Upper Yakima	214	152
Lower Yakima	197	151
Walla Walla	149	132
Lower Snake	141	124
Cowlitz-Lewis	181	148
White-Green-Puyallup	175	139
Central Puget Sound	189	159
North Puget Sound	189	143
Olympic Peninsula	137	144

Reservoir

Early season reservoir levels in Washington vary greatly due to specific watershed management practices required in preparation for winter collection. Reservoir storage in the Yakima Basin was 343,900 acre feet, or 73% of average for the Upper Reaches and 107,400 acre feet, 99% of average for Rimrock and Bumping Lakes. Storage at the Okanogan reservoirs was 142% of average for January 1. The power generation reservoirs included the following: Coeur d'Alene Lake, 114,500 acre feet, or 88% of average and 48% of capacity; Chelan Lake, 393,200 acre feet, 104% of average and 58% of capacity; and Ross Lake at 139% of average and 77% of capacity.

BASIN	PERCENT OF CAPACITY	PERCENT OF AVERAGE
Spokane	48	88
Colville-Pend Oreille	N/A	N/A
Okanogan-Methow	77	134
Wenatchee-Chelan	58	104
Upper Yakima	41	73
Lower Yakima	46	99
North Puget Sound	77	139

For more information contact your local Natural Resources Conservation Service office.

Streamflow

Early season forecasts indicate above normal summer flows for most streams in the state. They vary from 156% of average for the Colville River at Kettle Falls to 104% of average for the Dungeness River near Sequim. January forecasts for some Western Washington streams include: Cedar River near Cedar Falls, 118%; Green River, 116%; and the Skagit River, 112%. Some Eastern Washington streams include the Yakima River near Parker, 123%; the Wenatchee River at Peshastin, 125%; and the Spokane River near Post Falls, 105%. Volumetric forecasts are developed using current, historic, and average snowpack, precipitation and streamflow data collected and coordinated by organizations cooperating with NRCS.

Streamflows reported for December varied from well above to well below average. The South Fork Walla Walla River near Milton Freewater, had the highest flows with 194% of average. The Similkameen River at Nighthawk with 43% of average, had the lowest in the state. Other streamflows were the following percentage of average: the Priest River, 155%; the Columbia at the International Boundary, 98%; the Spokane at Spokane, 117%; the Columbia below Rock Island Dam, 101%; the Cle Elum River near Roslyn, 105%; and the Snake River below Ice Harbor Dam, 99%.

BASIN	PERCENT OF AVERAGE MOST PROBABLE FORECAST (50 PERCENT CHANCE OF EXCEEDENCE)
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Spokane	105-106
Colville-Pend Oreille	108-156
Okanogan-Methow	113-127
Wenatchee-Chelan	111-135
Upper Yakima	118-123
Lower Yakima	113-131
Walla Walla	113-135
Lower Snake	110-128
Cowlitz-Lewis	109-131
White-Green-Puyallup	115-116
Central Puget Sound	112-118
North Puget Sound	111-115
Olympic Peninsula	104-110

STREAM	PERCENT OF AVERAGE DECEMBER STREAMFLOWS
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Pend Oreille Below Box Canyon	98
Kettle at Laurier	157
Columbia at Birchbank	98
Spokane at Long Lake	125
Similkameen at Nighthawk	43
Okanogan at Tonasket	89
Methow at Pateros	122
Chelan at Chelan	92
Wenatchee at Pashastin	73
Yakima at Cle Elum	113
Yakima at Parker	116
Naches at Naches	141
Grande Ronde at Troy	150
Snake below Lower Granite Dam	118
SF Walla Walla near Milton Freewater	194
Lewis at Ariel	168
Cowlitz below Mayfield Dam	143
Skagit at Concrete	120

For more information contact your local Natural Resources Conservation Service office.

BASIN SUMMARY OF SNOW COURSE DATA

JANUARY 1999

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-90	SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-90
ANTANUM R.S.	3100	1/01/99	---	4.4E	4.7	3.5	MISSEZULA MTN CAN.	4700	1/02/99	24	5.5	2.6	5.1
ALPINE MEADOWS PILL	3500	1/01/99	---	19.3	13.2	17.9	MISSION CREEK CAN.	5800	1/01/99	47	12.2	5.7	8.9
ASHLEY DIVIDE	4820	1/01/99	---	3.7E	1.5	3.4	MOOSE CREEK PILL	6200	1/01/99	---	9.7	5.4	7.1
BADGER PASS PILL	6900	1/01/99	---	20.5	10.7	14.2	MORRISSEY RIDGE CAN.	6100	1/01/99	---	17.7	7.8	15.4
BARKER LAKES PILL	8250	1/01/99	---	6.9	5.0	6.8	MORSE LAKE PILL	5400	1/01/99	---	30.4	21.0	19.1
BASIN CREEK PILL	7180	1/01/99	---	5.0	4.6	3.6	MOSES MTN PILL	4800	1/01/99	---	14.4	3.6	6.5
BASSOO PEAK	5150	12/31/98	25	5.6	1.8	--	MOSQUITO RDG PILL	5200	1/01/99	---	23.8	9.6	15.7
BERNE-MILL CREEK (d)	3170	12/31/98	58	17.3	7.9	11.2	MOULTON RESERVOIR	6850	1/05/99	18	4.9	--	2.6
BLACK PINE PILL	7100	1/01/99	---	6.9	2.7	4.9	MOUNT CRAG PILL	4050	1/01/99	---	21.1	7.0	11.3
BLACKWALL PEAK CAN.	6370	1/01/99	---	25.4	11.5	14.8	MT. KOBAU CAN.	5500	12/30/98	28	7.8	2.5	6.2
BLEWETT PASS#2PILL	4270	1/01/99	---	9.2	4.6	8.3	MOUNT GARDNER PILL	2860	1/01/99	---	10.1	4.7	5.8
BRENDA MINE CAN.	4450	1/01/99	---	7.3	4.6	5.9	N.F. ELK CR PILL	6250	1/01/99	---	6.8	2.8	4.6
BUMPING LAKE (NEW)	3400	12/29/98	41	11.6	3.8	7.5	NEVADA CREEK PILL	6480	1/01/99	---	9.7	4.2	5.7
BUMPING RIDGE PILL	4600	1/01/99	---	21.5	8.6	9.6	NEZ PERCE CMP PILL	5650	1/01/99	---	7.8	5.0	5.7
BUNCHGRASS MDWPILL	5000	1/01/99	---	19.2	9.9	10.9	NOISY BASIN PILL	6040	1/01/99	---	16.7	13.4	17.2
CAYUSE PASS	5300	1/01/99	---	48.6E	29.2	32.4	OLALLIE MDWS PILL	3960	1/01/99	---	33.4	14.6	20.3
CHESSMAN RESERVOIR	6200	12/28/98	8	2.2	.0	1.5	OPHIR PARK	7150	12/27/98	29	6.9	3.8	7.0
CHIWAWKUM G.S.	2500	12/30/98	34	7.2	4.0	4.8	PARADISE PARK PILL	5500	1/01/99	---	40.7	21.5	23.6
COMBINATION PILL	5600	1/01/99	---	2.7	1.7	2.3	PARK CR RIDGE PILL	4600	1/01/99	---	31.0	16.1	1H.4
COPPER BOTTOM PILL	5200	1/01/99	---	8.5	1.9	4.7	PETERSON MDW PILL	7200	1/01/99	---	4.6	3.8	4.2
CORRAL PASS PILL	6000	1/01/99	---	21.3	14.2	13.5	PIGTAIL PEAK PILL	5900	1/01/99	---	37.0	15.8	20.1
COUGAR MTN. PILL	3200	1/01/99	---	6.9	5.0	8.3	PIKE CREEK PILL	5930	1/01/99	---	16.8	7.5	11.4
COYOTE HILL	4200	12/31/98	19	4.4	2.0	4.1	PIPESTONE PASS	7200	12/30/98	16	3.6	2.0	2.1
DALY CREEK PILL	5780	1/01/99	---	6.8	3.7	5.3	POPE RIDGE PILL	3540	1/01/99	---	27.1	5.6	9.1
DISCOVERY BASIN	7050	12/30/98	23	4.6	2.7	4.4	POTATO HILL PILL	4500	1/01/99	---	17.3	9.1	10.5
DIX HILL	6400	12/27/98	20	4.5	2.2	5.0	QUARTZ PEAK PILL	4700	1/01/99	---	12.8	6.7	8.5
DOMMERIE FLATS	2200	12/30/98	15	7.1	.0	3.9	RAINY PASS PILL	4780	1/01/99	---	27.9	13.7	15.4
EAST RAGGED SADDLE	3740	1/01/99	32	10.1	7.1	9.9	REX RIVER PILL	1900	1/01/99	---	13.9	8.1	10.5
ELBOW LAKE PILL	3200	1/01/99	---	20.4	9.4	14.1	ROCKER PEAK PILL	8000	1/01/99	---	6.7	5.3	6.4
EMERY CREEK PILL	4350	1/01/99	---	8.0	3.8	7.2	SF THUNDER CK AM	2200	1/01/99	---	6.0E	--	4.5
ENDERBY CAN.	5800	12/30/98	84	16.5	15.7	18.7	SADDLE MTN PILL	7900	1/01/99	---	14.7	9.5	11.1
FARRON CAN.	3700	12/31/98	29	6.9	1.6	7.0	SALMON MDWS PILL	4500	1/01/99	---	6.7	2.5	3.9
FISH CREEK	8000	1/05/99	25	7.2	--	4.5	SASSE RIDGE PILL	4200	1/01/99	---	23.0	10.3	12.4
FISH LAKE	3370	1/06/99	79	24.0	10.6	10.7	SAVAGE PASS PILL	6170	1/01/99	22	17.6	9.3	11.0
FISH LAKE PILL	3370	1/01/99	---	24.7	10.6	12.4	SAWMILL RIDGE	4700	1/02/99	45	14.0	11.7	13.3
FLATTOP MTN PILL	6300	1/01/99	---	29.3	14.4	21.0	SCHREIBERS MDW AM	3400	1/01/99	---	29.6E	--	21.9
FOURTH OF JULY SUM	3200	12/30/98	13	3.8	2.2	3.4	SHEEP CANYON PILL	4050	1/01/99	---	31.2	8.6	15.2
FROHNER MDWS PILL	6480	1/01/99	---	4.0	1.9	3.4	SILVER STAR MTN CAN.	5600	1/01/99	63	16.1	9.6	13.3
GRASS MOUNTAIN #2	2900	1/02/99	0	.0	.5	4.8	SKALKABO PILL	7260	1/01/99	---	14.9	8.1	
GRAVE CRK PILL	4300	1/01/99	---	7.4	4.4	7.7	SKOOKUM CREEK PILL	3920	1/01/99	---	9.7	6.8	
GREEN LAKE PILL	6000	1/01/99	---	15.6	6.1	9.0	SPENCER MDW PILL	3400	1/01/99	---	16.3	9.2	
GRIFFIN CR DIVIDE	5150	12/31/98	29	6.6	1.2	--	SPIRIT LAKE PILL	3100	1/01/99	---	.0E	3.1	1.8
GROUSE CAMP PILL	5380	1/01/99	---	15.7	4.6	8.9	SPOTTED BEAR MTN.	7000	1/02/99	30	7.0	3.0	6.6
HAMILTON HILL CAN.	4550	1/03/99	31	7.7	--	5.5	STABL PEAK PILL	6030	1/01/99	---	18.5	12.2	16.0
HAND CREEK PILL	5030	1/01/99	---	6.2	3.7	5.5	STAMPEDE PASS PILL	3860	1/01/99	---	20.7	12.4	16.7
HARTS PASS PILL	6500	1/01/99	---	29.0E	17.1	17.9	STEVENS PASS PILL	4070	1/01/99	---	23.3	12.2	15.3
HELL ROARING DIVIDE	5770	12/29/98	60	14.8	6.5	13.0	STEVENS PASS SAND SD	3700	12/31/98	64	21.8	9.0	14.6
HIGH RIDGE PILL	4980	1/01/99	---	13.9	5.8	9.7	STORM LAKE	7780	12/30/98	2H	6.6	5.4	5.4
HOODOO BASIN PILL	6050	1/01/99	---	26.9	12.3	19.0	STUART MOUNTAIN	7400	1/02/99	63	19.1	10.6	13.4
HUMBOLDT GLCH PILL	4250	1/01/99	---	8.4	1.4	5.6	SUMMERLAND RES CAN.	5050	12/30/98	25	4.8	2.5	4.4
ISINTOK LAKE CAN.	5100	12/31/98	22	4.3	1.6	3.3	SUNSET PILL	5540	1/01/99	---	11.7	4.0	15.8
JUNE LAKE PILL	3200	1/01/99	---	18.8	6.0	11.5	SURPRISE LKS PILL	4250	1/01/99	---	23.1	12.6	20.2
KELLOGG PEAK	5560	1/02/99	64	22.8	--	--	TEN MILE LOWER	6600	12/28/98	15	3.5	1.0	3.0
KLESILKWA CAN.	3450	1/02/99	31	9.6	--	3.2	TEN MILE MIDDLE	6800	12/28/98	21	5.0	2.6	4.7
KRAFT CREEK PILL	4750	1/01/99	---	6.1	4.3	6.6	TINKHAM CREEK PILL	3000	1/01/99	---	16.5	8.4	7.6
LESTER CREEK	3100	1/02/99	31	8.8	7.2	8.0	TOUCHET #2 PILL	5530	1/01/99	---	22.2	8.7	12.9
LOLO PASS PILL	5240	1/01/99	---	20.7	8.5	12.6	TRINKUS LAKE	6100	1/02/99	63	18.6	10.4	18.7
LONE PINE PILL	3800	1/01/99	---	23.1	10.1	12.0	TROUGH #2 PILL	5310	1/01/99	---	7.5	4.1	4.9
LOOKOUT PILL	5140	1/01/99	---	18.3	8.5	13.5	TRUMAN CREEK	4060	1/01/99	---	2.3E	1.2	2.0
LOST HORSE PILL	5000	1/01/99	---	15.0	4.4	15.3	TUNNEL AVENUE	2450	1/01/99	---	12.9E	5.0	8.1
LOST LAKE PILL	6110	1/01/99	---	31.7	16.6	25.8	TV MOUNTAIN	6800	1/02/99	41	10.3	5.6	7.2
LUBRECHT FOREST NO 3	5450	1/01/99	14	3.3	1.3	2.6	TWELVEMILE PILL	5600	1/01/99	---	10.7	6.1	7.2
LUBRECHT FOREST NO 4	4650	1/01/99	4	1.0	.5	1.4	TWIN CAMP	4100	1/02/99	32	10.0	7.2	10.0
LUBRECHT FOREST NO 6	4040	1/04/99	6	1.2	.4	1.6	TWIN LAKES PILL	6400	1/01/99	---	25.4	14.5	16.3
LUBRECHT HYDROPLT	4200	1/01/99	11	3.1	1.2	2.8	TWIN SPIRIT DIVIDE	3480	1/01/99	22	6.4	4.0	6.8
LUBRECHT PILL	4680	1/01/99	---	2.8	1.9	2.4	UPPER HOLLAND LAKE	6200	1/02/99	59	15.0	11.8	15.8
LYMAN LAKE PILL	5900	1/01/99	---	40.4	26.4	25.4	UPPER WHEELER PILL	4400	1/01/99	---	8.1	4.4	5.9
LYNN LAKE	4000	1/02/99	20	6.3	7.9	7.6	WARM SPRINGS PILL	7800	1/01/99	---	11.2	8.6	9.4
MARIAS PASS	5250	12/30/98	44	10.7	4.0	6.7	WEASEL DIVIDE	5450	12/28/98	65	18.6	9.7	15.3
MEADOWS PASS PILL	3240	1/01/99	---	12.6	6.3	9.5	WELLS CREEK PILL	4200	1/01/99	---	19.1	8.6	15.2
MERRITT	2140	12/31/98	37	9.5	2.8	7.1	WHITE PASS ES PILL	4500	1/01/99	---	11.3	5.8	9.8
MICA CREEK PILL	4750	1/01/99	---	13.9	5.6	--	WHITE ROCKS MTN CAN.	7200	1/02/99	59	17.2	--	10.7



Natural Resources Conservation Service

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Helpful Internet Addresses

NRCS Snow Survey and Climate Services Homepages

Washington:

<http://www.wa.nrcs.usda.gov/nrcs/CoopSnoSrvy.htm>

Oregon:

<http://crystal.or.nrcs.usda.gov/snowsveys>

Idaho:

<http://idsnow.id.nrcs.usda.gov>

National Water and Climate Center (NWCC):

<http://www.wcc.nrcs.usda.gov>

NWCC Anonymous FTP Server:

<ftp.wcc.nrcs.usda.gov>

USDA-NRCS Agency Homepages

Washington:

<http://www.wa.nrcs.usda.gov/nrcs>

NRCS National:

<http://www.ftw.nrcs.usda.gov>



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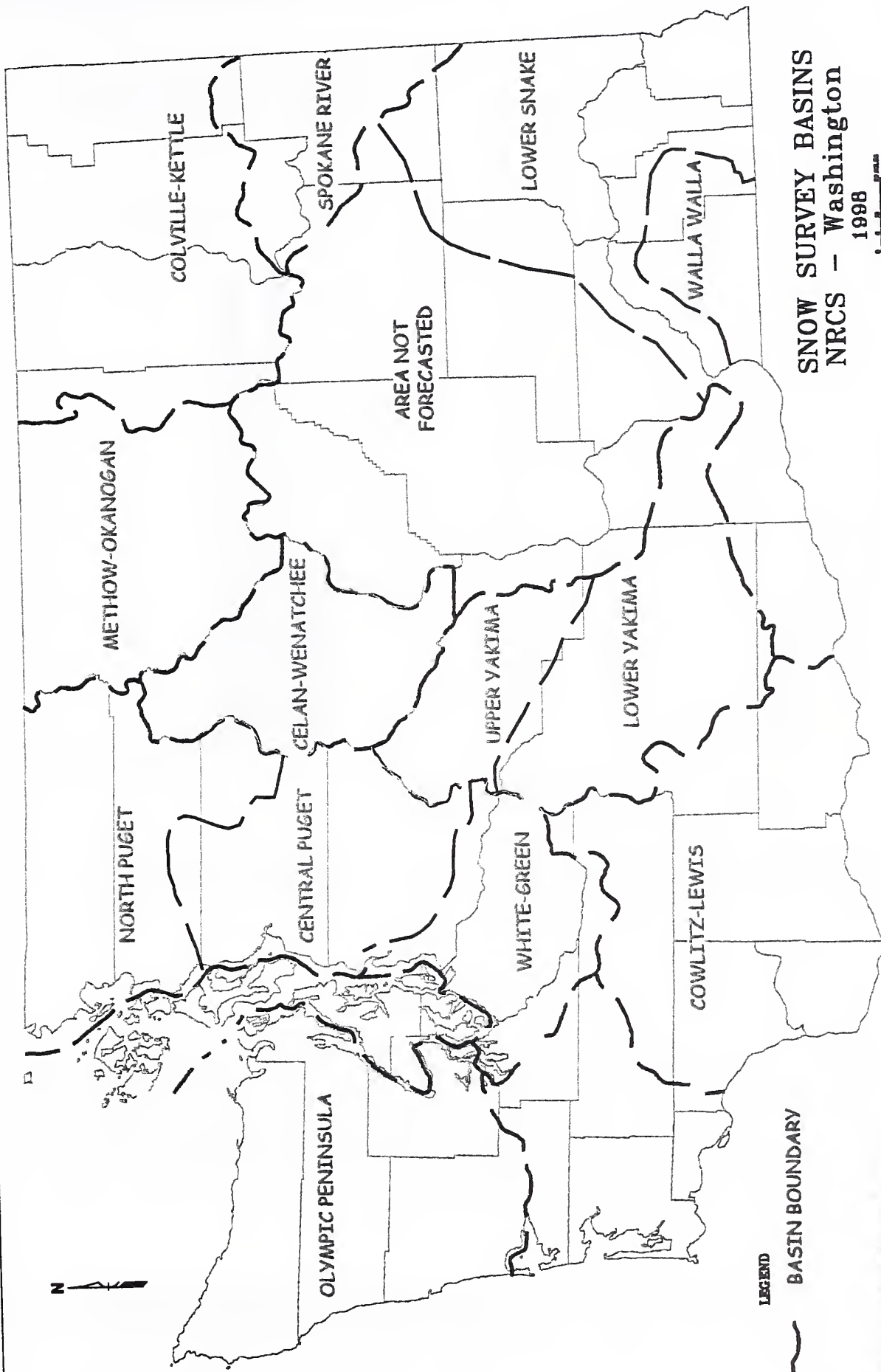
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LEGEND

— BASIN BOUNDARY

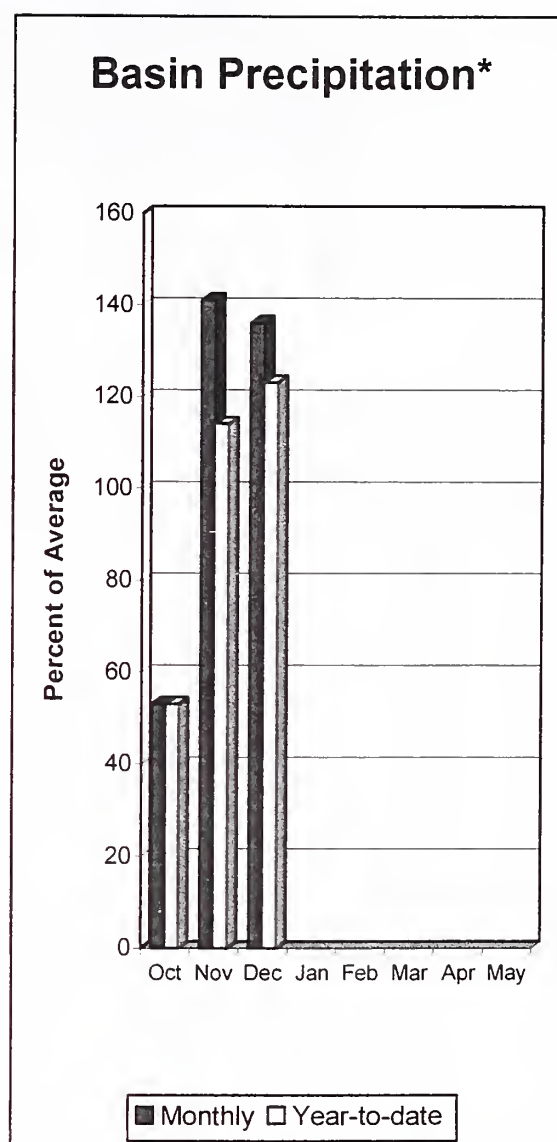
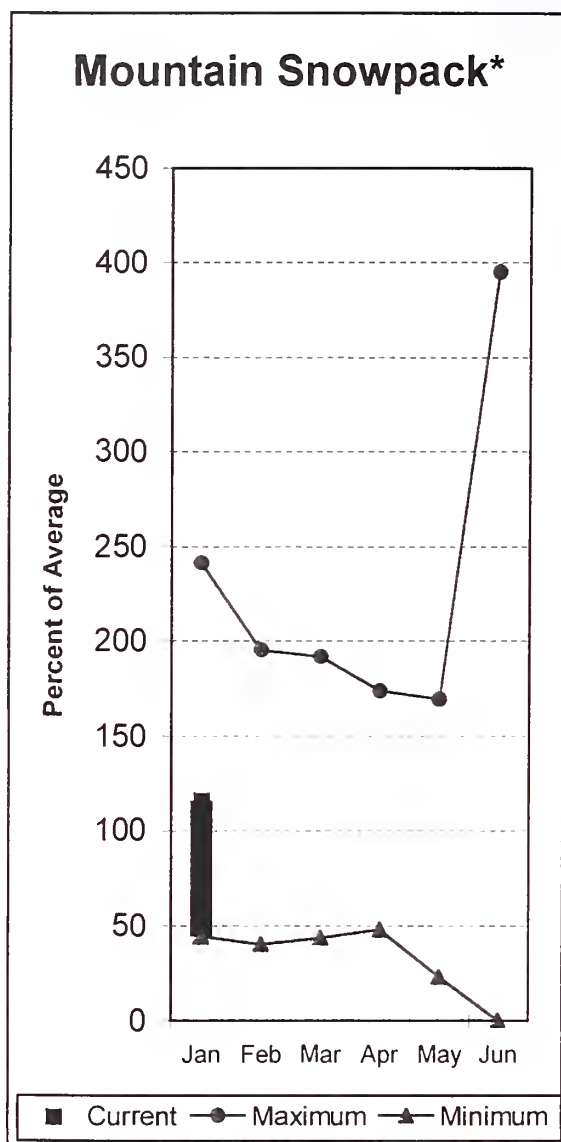
SNOW SURVEY BASINS
NRCS - Washington

1998



U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
WASHINGTON STATE OFFICE, SPOKANE

Spokane River Basin



*Based on selected stations

The January 1 forecasts for summer runoff within the Spokane River Basin are 105% of average near Post Falls and 106% of average at Long Lake. The forecast is based on a basin snowpack that is 116% of average and precipitation that is 123% of average for the water year. Precipitation for December was well above normal at 136% of average. Streamflow on the Spokane River at Long Lake, was 125% of average for December. January 1 storage in Coeur d'Alene Lake, was 114,500 acre feet, 88% of average and 48% of capacity. Snowpack at Quartz Peak SNOTEL site contained 12.8 inches of water, compared to the average January 1 reading of 8.5 inches. Average temperatures in the Spokane basin were near normal.

For more information contact your local Natural Resources Conservation Service office.

Spokane River Basin

Streamflow Forecasts - January 1, 1999

SPOKANE near Post Falls (2)	APR-SEP	2067	2545		2870	105		3195	3673	2730
	APR-JUL	1985	2452		2770	105		3088	3555	2633
SPOKANE at Long Lake	APR-JUL	2307	2793		3123	106		3453	3939	2936
	APR-SEP	2504	3008		3351	106		3694	4198	3159

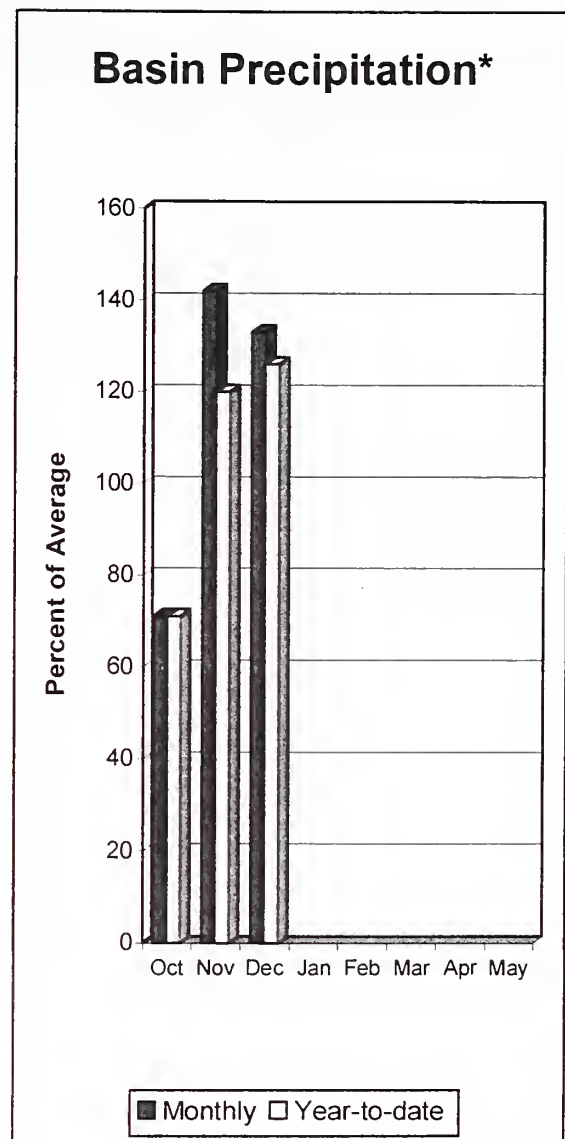
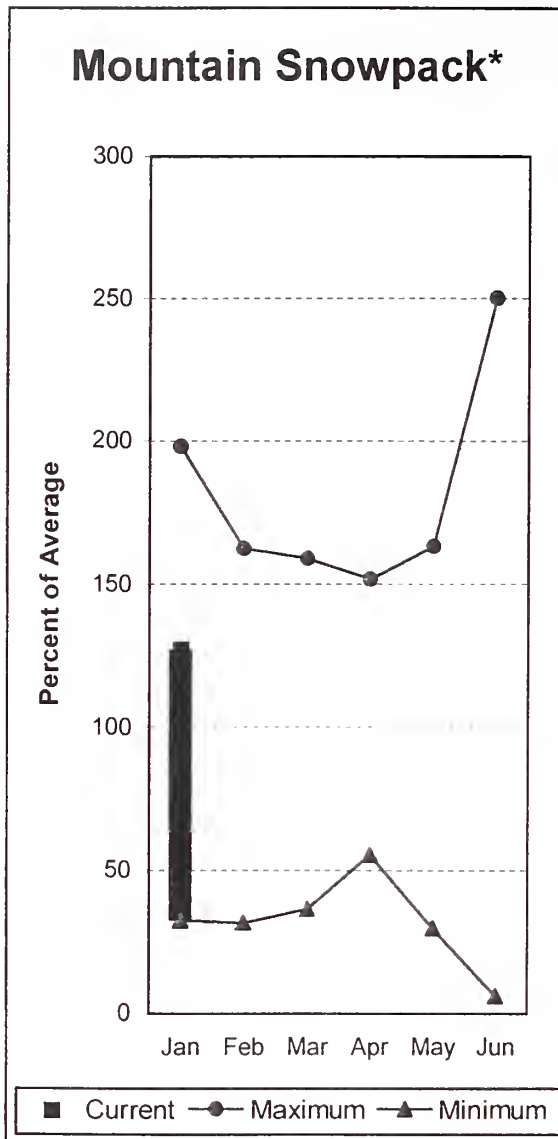
SPOKANE RIVER BASIN Reservoir Storage (1000 AF) - End of December					SPOKANE RIVER BASIN Watershed Snowpack Analysis - January 1, 1999			
Reservoir	Usable Capacity	*** This Year	Usable Storage Last Year	*** Avg	Watershed	Number of Data Sites	This Year as % of Last Yr Average	
COEUR D'ALENE	238.5	114.5	56.8	130.5	SPOKANE RIVER	10	200	116
					NEWMAN LAKE	1	191	151

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural flow - actual flow may be affected by upstream water management.

Colville - Pend Oreille River Basins



*Based on selected stations

The summer forecast for the Kettle River streamflow is 129% of average; the Pend Oreille below Box Canyon, 113%; and the Priest River near the town of Priest River, 108% of average. December streamflow was 98% of average on the Pend Oreille River; 98% on the Columbia at the International Boundary; and 157% on the Kettle River. January 1 snow cover was 127% of average in the Pend Oreille Basin and 99% of average in the Kettle River Basin. Precipitation during December was 133% of average, bringing the year-to-date precipitation to 126% of average. Reservoir storage in Roosevelt and Banks lakes was reported to be 91% of average and 79% of capacity on January 1. Average temperatures were near normal.

For more information contact your local Natural Resources Conservation Service office.

Colville - Pend Oreille River Basins

Streamflow Forecasts - January 1, 1999

		<<----- Drier ----- Future Conditions ----- Wetter ----->>						
Forecast Point	Forecast Period	Chance Of Exceeding *						30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
PEND OREILLE Lake Inflow (1,2)	APR-JUL	9417	13119	14800	113	16481	20183	13150
	APR-SEP	10213	14261	16100	112	17939	21987	14370
	APR-JUN	7819	11313	12900	113	14487	17981	11390
PRIEST nr Priest River (1,2)	APR-JUL	566	779	875	108	971	1184	814
	APR-SEP	606	832	935	108	1038	1264	868
PEND OREILLE ol Box Canyon (1,2)	APR-JUL	10443	13646	15100	113	16554	19757	13380
	APR-SEP	11417	14913	16500	113	18087	21583	14590
	APR-JUN	9093	11849	13100	113	14351	17107	11570
COLVILLE at Kettle Falls	APR-SEP	150	182	203	155	224	256	131
	APR-JUL	137	167	187	156	207	237	120
	APR-JUN	128	155	173	156	191	218	111
KETTLE near Laurier	APR-SEP	1993	2232	2394	129	2556	2795	1854
	APR-JUL	1893	2117	2270	129	2423	2647	1761
	APR-JUN	1662	1868	2007	127	2146	2352	1585
COLUMBIA at Birchbank (1,2)	APR-JUL	29207	34910	37500	107	40090	45793	35140
	APR-SEP	36413	43556	46800	107	50044	57187	43810
	APR-JUN	21498	25625	27500	107	29375	33502	25670
COLUMBIA at Grand Coulee Dm (1,2)	APR-SEP	52245	64730	70400	109	76070	88555	64850
	APR-JUL	43976	54445	59200	109	63955	74424	54543
	APR-JUN	34740	42896	46600	109	50304	58460	42756

COLVILLE - PEND OREILLE RIVER BASINS Reservoir Storage (1000 AF) - End of December

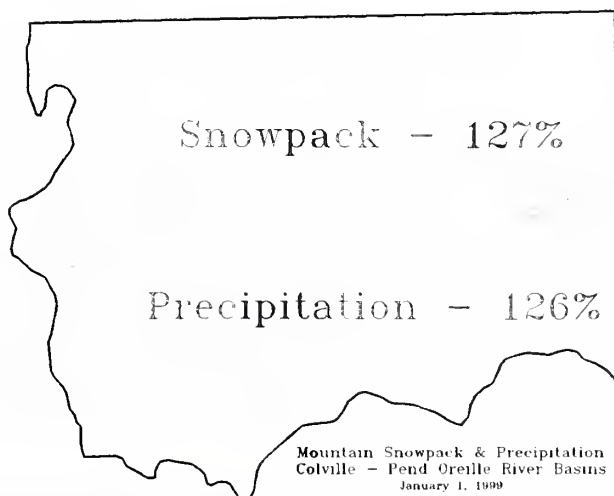
COLVILLE - PEND OREILLE RIVER BASINS Watershed Snowpack Analysis - January 1, 1999

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
ROOSEVELT		NO REPORT			COLVILLE RIVER	0	0	0
BANKS		NO REPORT			PEND OREILLE RIVER	60	190	127
					KETTLE RIVER	1	431	99

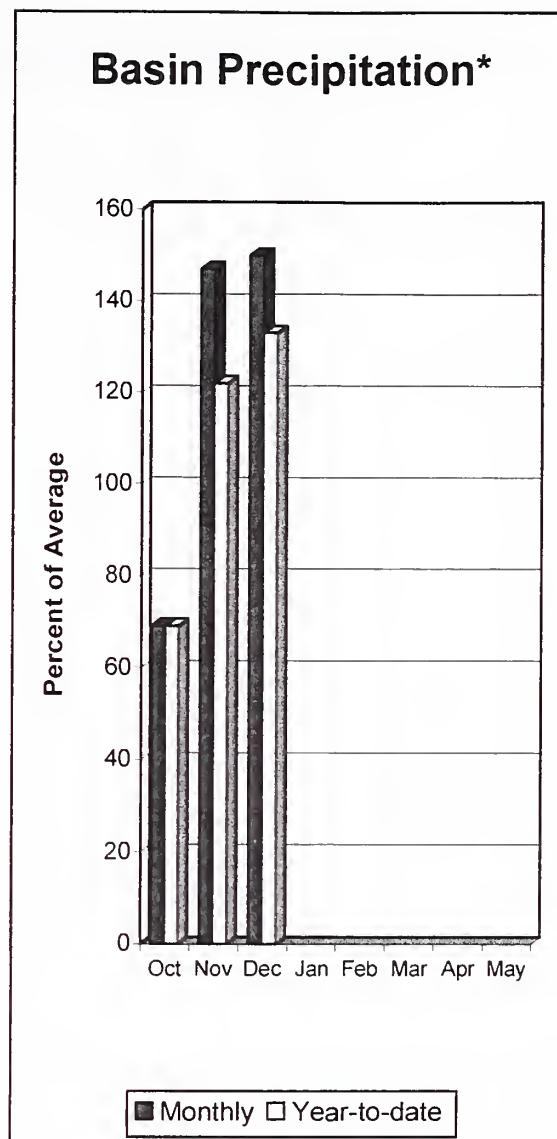
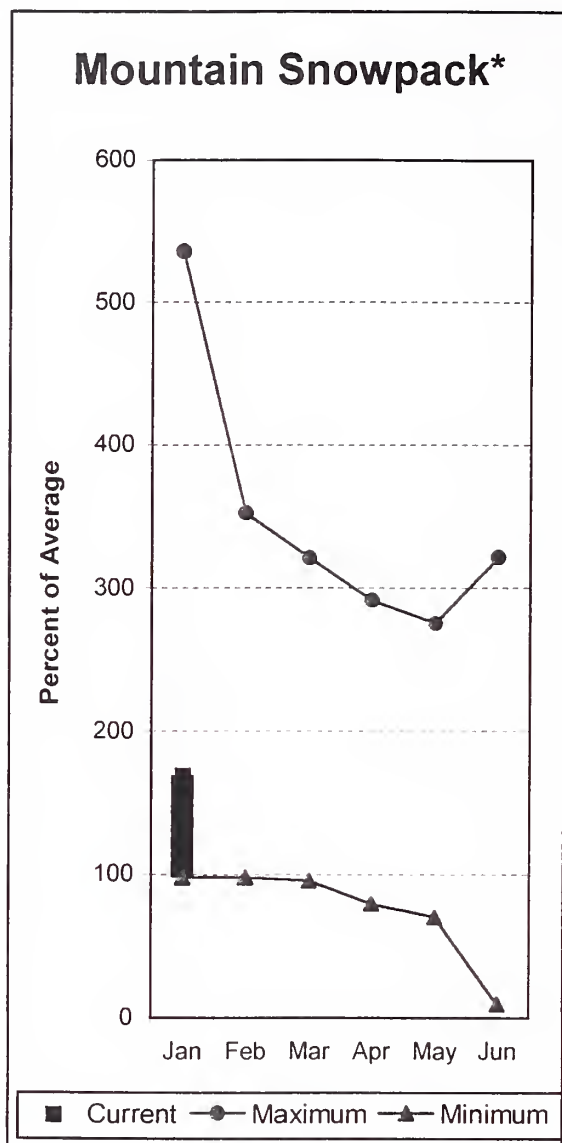
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
 (2) - The value is natural flow - actual flow may be affected by upstream water management.



Okanogan - Methow River Basins



*Based on selected stations

Summer runoff forecast for the Okanogan River is 123% of average; the Similkameen River, 125%; the Methow River, 127%; and Salmon Creek, 113% of average. January 1 snow cover on the Okanogan was 127% of average; the Methow, 171%; and the Similkameen River, 155%. Moses Mountain SNOTEL site had a January 1 reading of 222% of average. December precipitation in the Okanogan-Methow was 150% of average, with precipitation for the water year at 133% of average. December streamflow for the Methow River was 122% of average; 89% for the Okanogan River; and 43% for the Similkameen. Snow-water-content at the Salmon Meadows SNOTEL, near Conconully, was 6.7 inches. Average for this site is 3.9 inches on January 1. Combined storage in the Conconully Reservoirs was 18,000 acre feet, which is 77% of capacity and 134% of the January 1 average. Temperatures were slightly above normal for the past month.

For more information contact your local Natural Resources Conservation Service office.

Okanogan - Methow River Basins

Streamflow Forecasts - January 1, 1999

Forecast Point	Forecast Period	<<==== Drier ===== Future Conditions ===== Wetter =====>>						
		Chance Of Exceeding *						30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
SIMILKAMEEN near Nighthawk (1)	APR-JUL	970	1424	1630	125	1836	2290	1304
	APR-SEP	1049	1531	1750	125	1969	2451	1399
	APR-JUN	869	1227	1390	125	1553	1911	1113
OKANOGAN near Tonasket (1)	APR-JUL	1003	1555	1805	123	2055	2607	1466
	APR-SEP	1113	1716	1990	123	2264	2867	1623
	APR-JUN	867	1313	1515	123	1717	2163	1233
SALMON CREEK near Conconully	APR-JUL	6.3	15.4	22	113	28	37	19.1
	APR-SEP	6.8	16.2	23	113	29	38	20
METHOW RIVER near Pateros	APR-SEP	891	1075	1200	127	1325	1509	942
	APR-JUL	828	996	1110	127	1224	1392	873
	APR-JUN	706	849	947	127	1045	1188	746

OKANOGAN - METHOW RIVER BASINS Reservoir Storage (1000 AF) - End of December

Reservoir	Usable Capacity	*** Usable Storage ***		
		This Year	Last Year	Avg
SALMON LAKE	10.5	8.3	8.6	7.5
CONCONULLY RESERVOIR	13.0	9.7	10.4	5.9

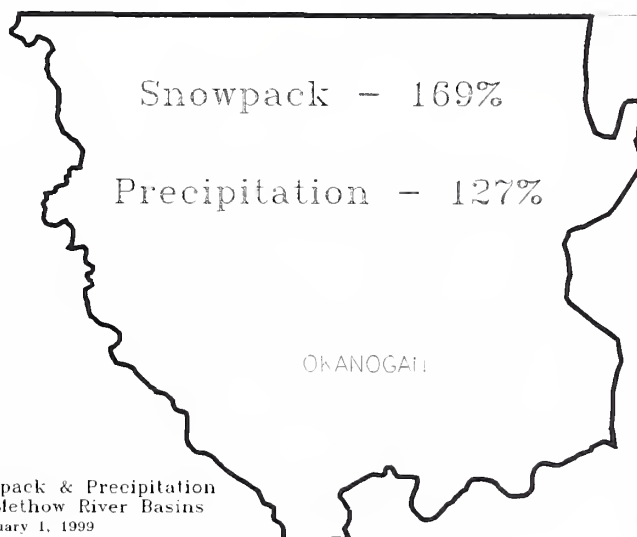
OKANOGAN - METHOW RIVER BASINS Watershed Snowpack Analysis - January 1, 1999

Watershed	Number of Data Sites	This Year as % of	
		Last Yr	Average
OKANOGAN RIVER	9	169	127
OMAK CREEK	1	400	222
SANPOIL RIVER	0	0	0
SIMILKAMEEN RIVER	2	219	155
CONCONULLY LAKE	1	268	172
METHOW RIVER	3	191	171

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

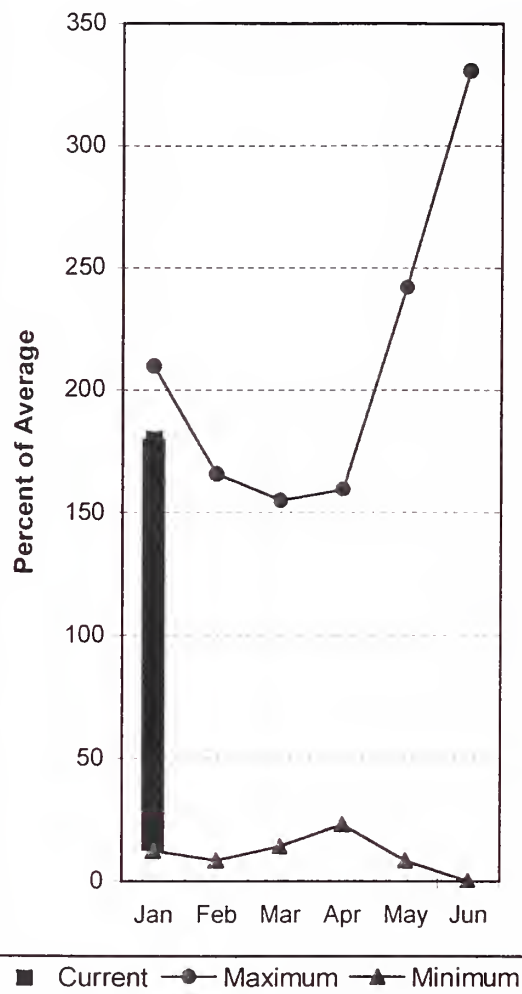
- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
 (2) - The value is natural flow - actual flow may be affected by upstream water management.



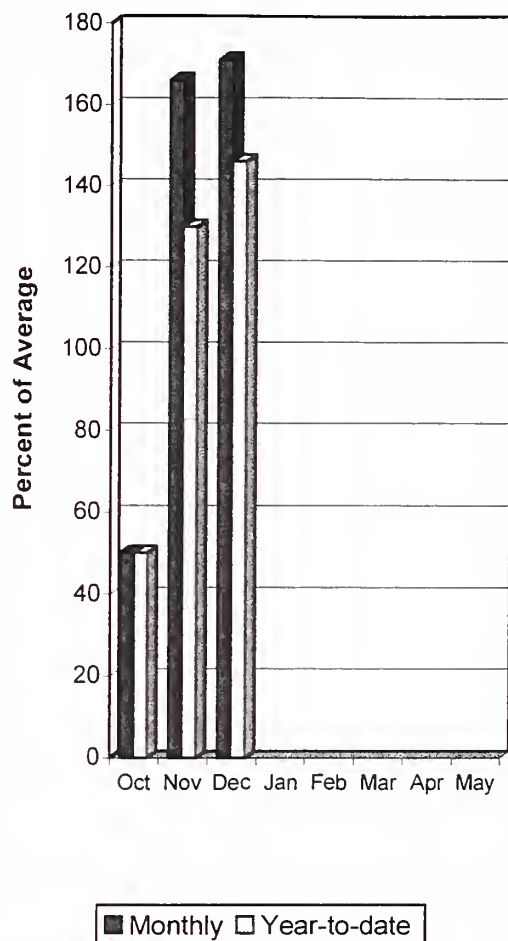
Mountain Snowpack & Precipitation
 Okanogan - Methow River Basins
 January 1, 1999

Wenatchee - Chelan River Basins

Mountain Snowpack*



Basin Precipitation*



*Based on selected stations

Precipitation during December was 171% of average in the basin and 146% for the year-to-date. Runoff for the Entiat River is forecast to be 135% of average for the summer. The April-September forecast for the Chelan River is for 123% of average; for the Wenatchee River at Plain it is 128%; and for the Stehekin it is 127% of average. Icicle, Stemilt and Squilchuck creeks are all expected to be much the same this summer. December streamflows on the Chelan River were 92% of average, and the Wenatchee River averaged 73% of normal flows. January 1 snowpack in the Wenatchee Basin was 160% of average. The Chelan Basin was 155% of average; Colockum Ridge was 153%; and Stemilt Creek was 137% of average. Snowpack in the Entiat River Basin was 298% of average. Reservoir storage in Lake Chelan was 393,200 acre feet, or 134% of January 1 average and 58% of capacity. Lyman Lake SNOTEL had the most snow water with 40.4 inches of water. This site would normally have 25.4 inches on January 1. Temperatures were about 1 degree above normal for December.

For more information contact your local Natural Resources Conservation Service office.

Wenatchee - Chelan River Basins

Streamflow Forecasts - January 1, 1999

Forecast Point	Forecast Period	<<===== Drier =====		Future Conditions		===== Wetter =====>>		30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
CHELAN RIVER near Chelan	APR-SEP	1279	1369	1430	123	1491	1581	1160
	APR-JUL	1150	1222	1270	124	1318	1390	1024
	APR-JUN	929	976	1007	124	1038	1085	812
STEHEKIN near STEHEKIN	APR-SEP	938	1005	1050	127	1095	1162	827
	APR-JUL	824	867	897	128	927	970	701
	APR-JUN	658	677	690	128	703	722	538
ENTIAT RIVER near Ardenvoir	APR-SEP	234	277	306	135	335	378	227
	APR-JUL	210	249	276	134	303	342	206
	APR-JUN	169	199	220	130	241	271	169
WENATCHEE at Plain	APR-SEP	1233	1407	1525	128	1643	1817	1190
	APR-JUL	1133	1274	1370	128	1466	1607	1072
	APR-JUN	934	1037	1106	128	1175	1278	864
WENATCHEE R. at Peshastin	APR-SEP	1440	1797	2040	125	2283	2640	1636
	APR-JUL	1314	1636	1855	125	2074	2396	1485
	APR-JUN	1070	1329	1505	125	1681	1940	1204
STEMILT nr Wenatchee (miners in)	MAY-SEP	130	159	179	130	199	228	138
ICICLE CREEK near Leavenworth	APR-SEP	372	410	436	127	462	500	344
	APR-JUL	344	380	404	127	428	464	318
	APR-JUN	282	312	333	127	354	384	263
COLUMBIA R. bl Rock Island Dam (2)	APR-SEP	58323	70277	78400	111	86523	98477	70485
	APR-JUL	49435	59537	66400	111	73263	83365	59736
	APR-JUN	38936	46834	52200	111	57566	65464	47007

WENATCHEE - CHELAN RIVER BASINS Reservoir Storage (1000 AF) - End of December

WENATCHEE - CHELAN RIVER BASINS Watershed Snowpack Analysis - January 1, 1999

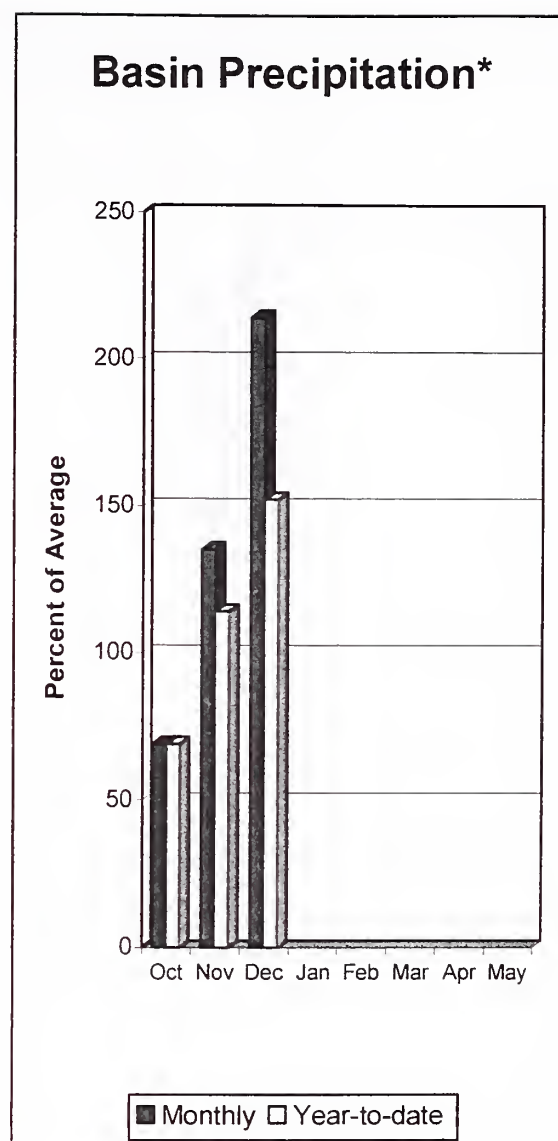
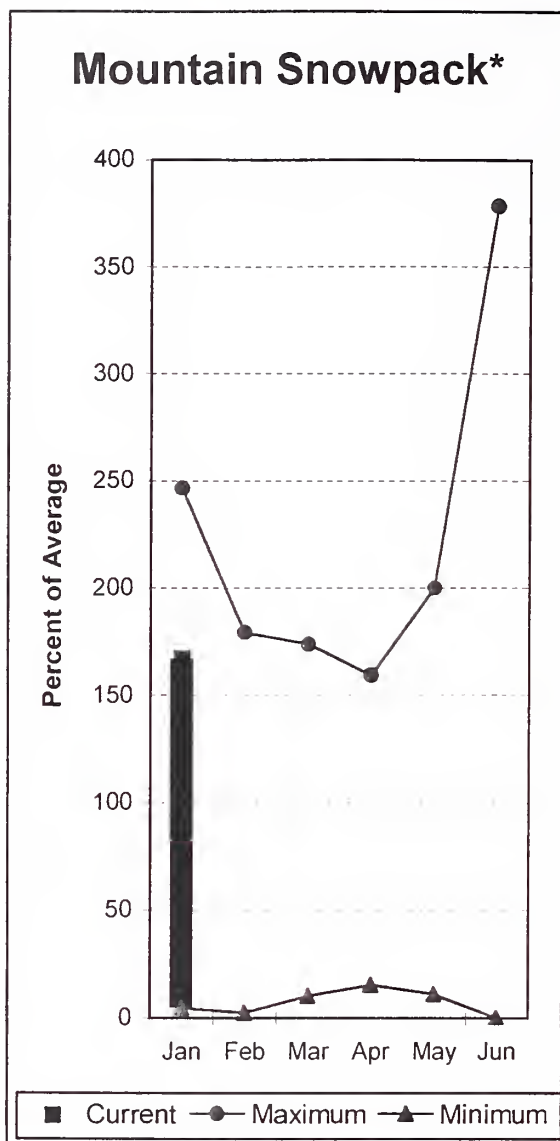
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
CHELAN LAKE	676.1	393.2	469.5	378.7	CHELAN LAKE BASIN	4	166	155
					ENTIAT RIVER	1	484	298
					WENATCHEE RIVER	11	200	160
					SQUILCHUCK CREEK	0	0	0
					STEMILT CREEK	1	184	137
					COLOCKUM CREEK	1	183	153

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural flow - actual flow may be affected by upstream water management.

Upper Yakima River Basin



*Based on selected stations

January 1 reservoir storage for the Upper Yakima reservoirs was 343,900 acre feet, or 73% of average. Forecasts for the Yakima River at Cle Elum are for 121% of average. Lake inflows are all expected to be above average this summer. December streamflows within the basin were: the Yakima near Cle Elum 113%; and the Cle Elum River near Roslyn at 105%. January 1 snowpack was 167% based upon 10 snow courses and SNOTEL readings within the Upper Yakima Basin. Precipitation was 214% of average for December and 152% for the water year-to-date. Volume forecasts for the Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

For more information contact your local Natural Resources Conservation Service office.

Upper Yakima River Basin

Streamflow Forecasts - January 1, 1999

Forecast Point	Forecast Period	<<===== Drier ===== Future Conditions ===== Wetter =====>>						30-Yr Avg. (1000AF)
		Chance Of Exceeding *		Chance Of Exceeding *		Chance Of Exceeding *		
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
KEECHELUS LAKE INFLOW	APR-JUL	115	137	152	123	167	189	124
	APR-SEP	125	149	165	122	181	205	135
	APR-JUN	104	121	133	122	145	162	109
KACHESS LAKE INFLOW	APR-JUL	99	121	135	122	149	171	111
	APR-SEP	105	128	143	121	158	181	118
	APR-JUN	94	111	122	123	133	150	99
CLE ELUM LAKE INFLOW	APR-JUL	378	440	482	118	524	586	409
	APR-SEP	413	483	530	118	577	647	448
	APR-JUN	329	376	407	118	438	485	345
YAKIMA at Cle Elum	APR-JUN	689	798	872	121	946	1055	721
	APR-JUL	791	925	1016	122	1107	1241	832
	APR-SEP	868	1012	1110	121	1208	1352	915

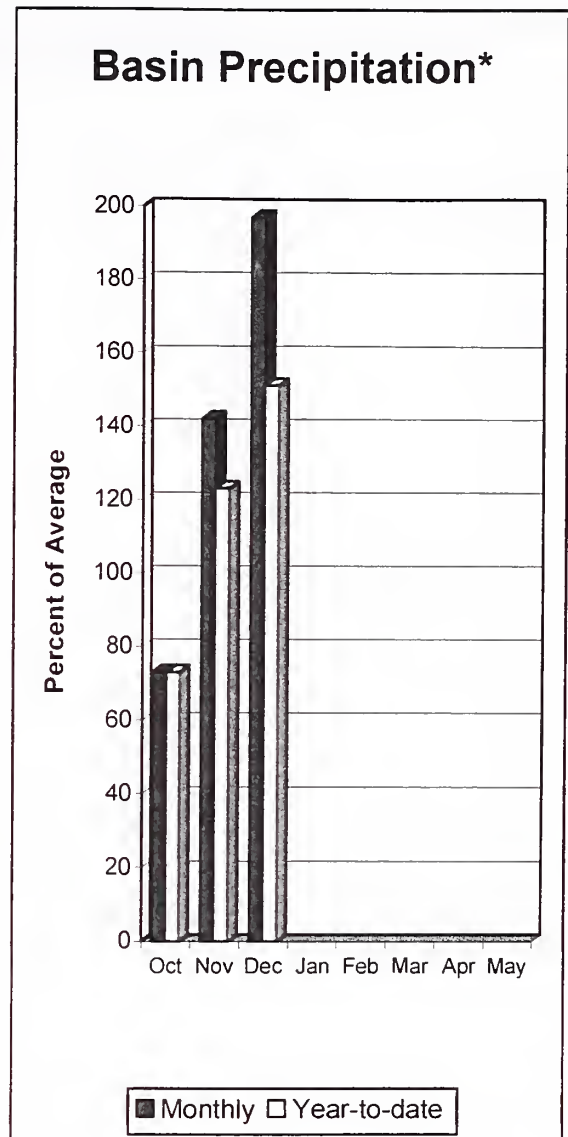
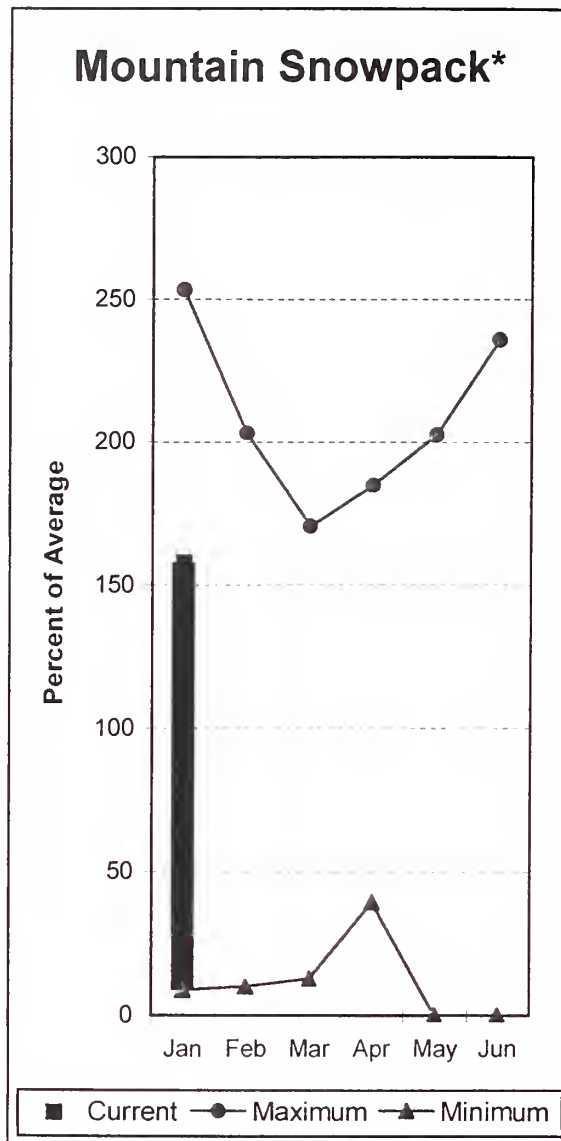
UPPER YAKIMA RIVER BASIN Reservoir Storage (1000 AF) - End of December					UPPER YAKIMA RIVER BASIN Watershed Snowpack Analysis - January 1, 1999			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
KEECHELUS	157.8	69.0	123.1	83.0	UPPER YAKIMA RIVER	10	240	171
KACHESS	239.0	124.7	152.7	159.1				
CLE ELUM	436.9	150.2	309.1	230.2				

, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural flow - actual flow may be affected by upstream water management.

Lower Yakima River Basin



*Based on selected stations

December streamflows within the basin were: the Yakima River near Parker, 116%; the Naches River near Naches, 141%, and the Yakima River at Kiona, 106% of average. January 1 reservoir storage for the Bumping and Rimrock reservoirs was 107,400 acre feet, or 99% of average. Forecasts for the Yakima River at Parker, are for 123% of average; American River near Nile, 117%; Ahtanum Creek, 117%; and the Klickitat River near Glenwood, 131%. January 1 snowpack was 158% based upon 8 snow courses and SNOTEL readings within the Lower Yakima Basin. Precipitation was 197% of average for December and 151% for the water year-to-date.

Volume forecasts for the Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow. Temperatures for the month were 1 degree above normal.

For more information contact your local Natural Resources Conservation Service office.

Lower Yakima River Basin

Streamflow Forecasts - January 1, 1999

		<<===== Drier ===== Future Conditions ===== Wetter =====>>						
Forecast Point	Forecast Period	Chance Of Exceeding *						30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
BUMPING LAKE INFLOW	APR-SEP	125	149	165	121	181	205	136
	APR-JUL	115	136	150	121	164	185	124
	APR-JUN	99	115	126	121	137	153	104
AMERICAN RIVER near Nile	APR-SEP	107	125	138	117	151	169	118
	APR-JUL	98	115	127	117	139	156	109
	APR-JUN	80	95	104	113	114	128	92
RIMROCK LAKE INFLOW	APR-SEP	215	248	270	113	292	325	238
	APR-JUL	180	207	226	113	245	272	200
	APR-JUN	148	169	183	113	197	218	162
NACHES near Naches	APR-SEP	780	905	990	119	1075	1200	832
	APR-JUL	700	817	896	119	975	1092	755
	APR-JUN	605	703	770	118	837	935	651
AHTANUM CREEK nr Tampico (2)	APR-SEP	33	46	54	117	63	75	46
	APR-JUL	30	41	49	117	57	68	42
	APR-JUN	26	35	42	117	49	59	36
YAKIMA near Parker	APR-SEP	1956	2250	2450	123	2650	2944	1994
	APR-JUL	1792	2068	2256	125	2444	2720	1805
	APR-JUN	1579	1815	1975	124	2135	2371	1597
KLICKITAT near Glenwood	APR-JUN	106	128	142	129	156	178	110
	APR-SEP	138	165	183	131	201	228	140

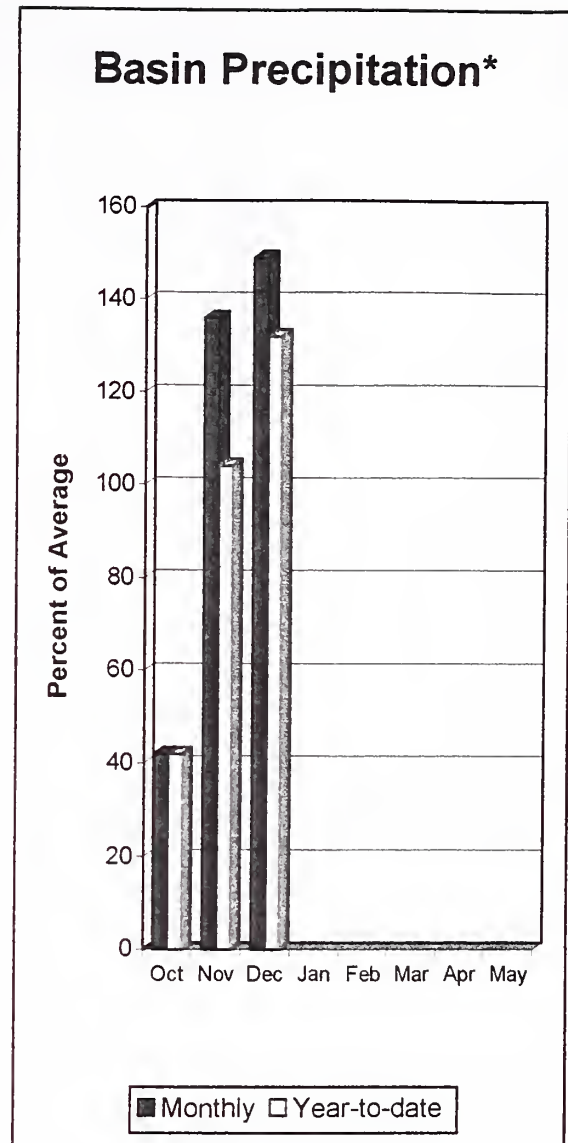
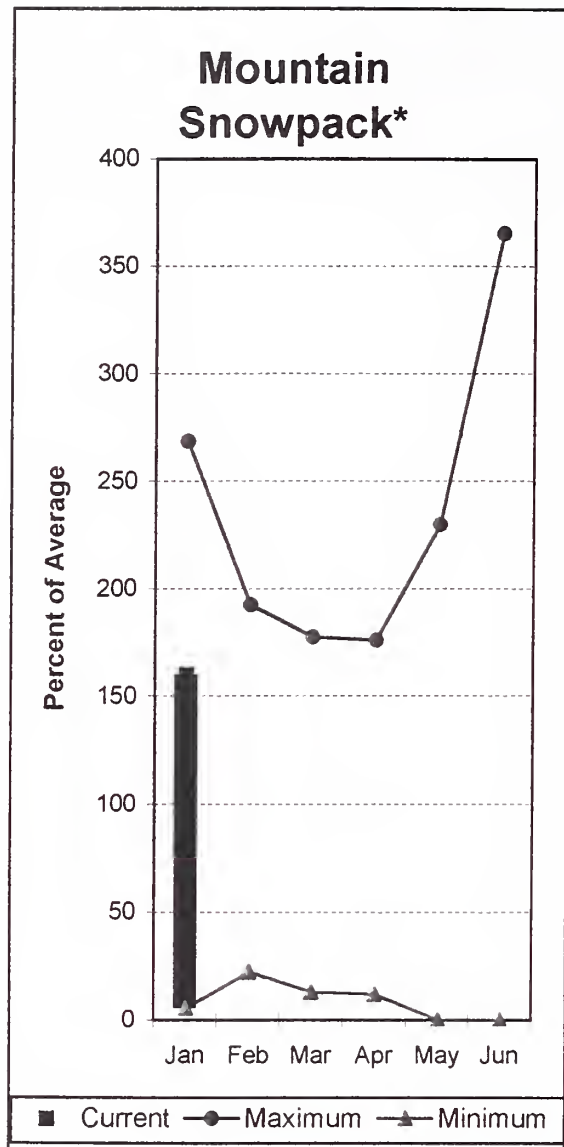
LOWER YAKIMA RIVER BASIN Reservoir Storage (1000 AF) - End of December					LOWER YAKIMA RIVER BASIN Watershed Snowpack Analysis - January 1, 1999			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
BUMPING LAKE	33.7	21.4	9.4	6.3	LOWER YAKIMA RIVER	8	176	158
RIMROCK	198.0	86.0	134.0	102.1	AHTANUM CREEK	3	230	126

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
 (2) - The value is natural flow - actual flow may be affected by upstream water management.

Walla Walla River Basin



*Based on selected stations

December precipitation was 147% of average, bringing the year-to-date precipitation to 121% of average. January 1 snowpack was at 160% of average. The forecast is for 113% of average streamflow in the South Fork Walla Walla River for the coming summer; and 135% for Mill Creek. December streamflow was 194% of average for the Walla Walla River. The Touchet SNOTEL site had 22.2 inches of snow-water-equivalent. The average January 1 reading for this site is 12.9 inches. Average temperatures were near normal for the area.

For more information contact your local Natural Resources Conservation Service office.

Walla Walla River Basin

Streamflow Forecasts - January 1, 1999

		<<===== Drier ===== Future Conditions ===== Wetter =====>>						
Forecast Point	Forecast Period	Chance Of Exceeding *						30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
=====								
MILL CREEK at Walla Walla	APR-SEP	13.2	19.0	23	135	27	33	17.1
	APR-JUL	13.0	18.8	23	135	27	33	16.9
	APR-JUN	12.8	18.6	23	135	26	32	16.7
=====								
SF WALLA WALLA near Milton-Freewater	APR-JUL	49	56	61	115	66	73	53
	APR-SEP	62	69	75	113	80	88	66

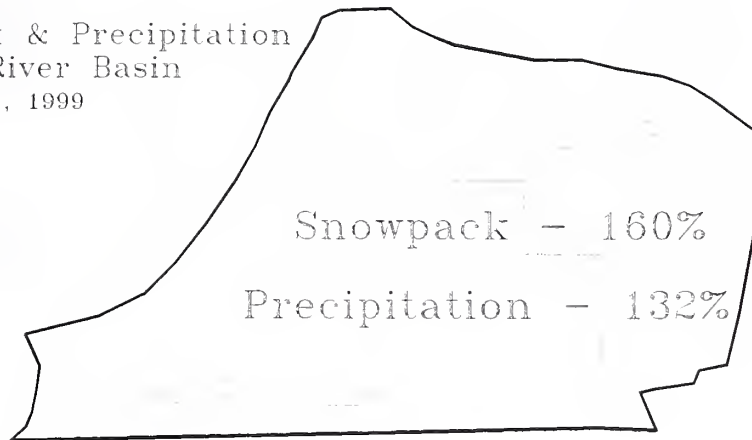
WALLA WALLA RIVER BASIN Reservoir Storage (1000 AF) - End of December					WALLA WALLA RIVER BASIN Watershed Snowpack Analysis - January 1, 1999			
Reservoir	Usable Capacity	*** This Year	Usable Storage Last Year	*** Avg	Watershed	Number of Data Sites	This Year as % of Last Yr Average	
					WALLA WALLA RIVER	2	249	160

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

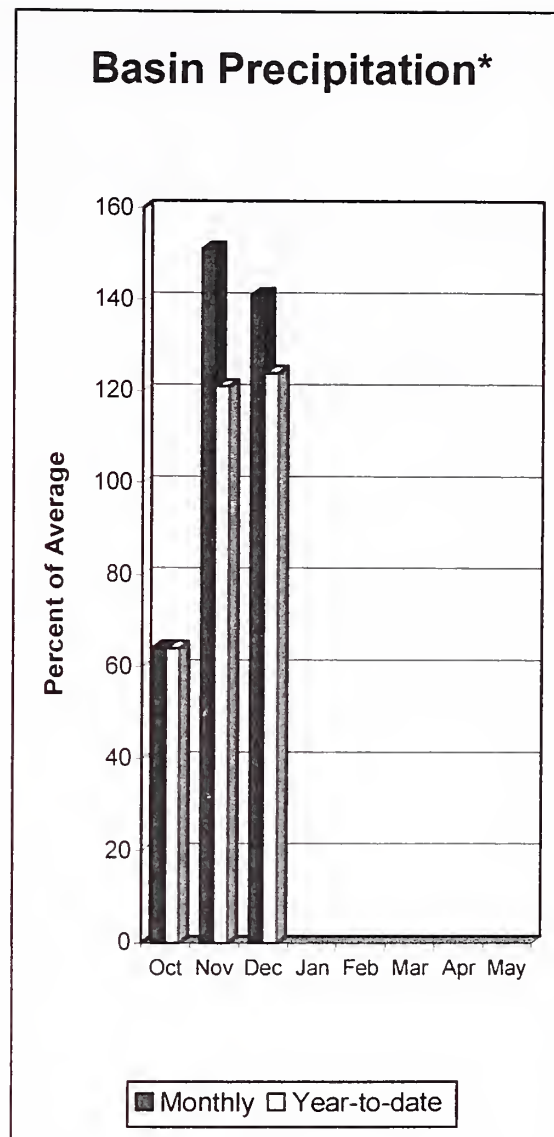
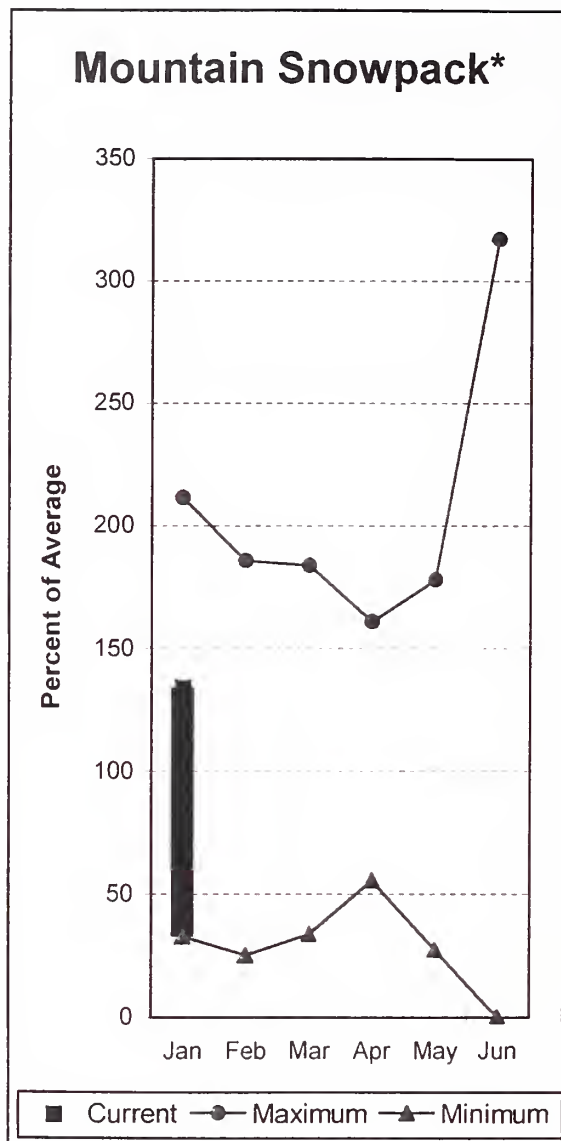
The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
 (2) - The value is natural flow - actual flow may be affected by upstream water management.

Mountain Snowpack & Precipitation
 Walla Walla River Basin
 January 1, 1999



Lower Snake River Basin



*Based on selected stations

The April - September forecast is for 110% of average streamflow in the Snake River below Lower Granite Dam, the Grande Ronde at Troy, 128%, and the Clearwater River at Spalding, 114%. December precipitation was 141% of average, bringing the year-to-date precipitation to 124% of average. January 1 snowpack was at 134% of average. December streamflow was 119% of average for the Clearwater River; 118% for the Snake River below Lower Granite Dam; and 150% for the Grande Ronde River near Troy. Average temperatures were slightly below normal for the area.

For more information contact your local Natural Resources Conservation Service office.

Lower Snake River Basin

Streamflow Forecasts - January 1, 1999

		<<===== Drier =====		Future Conditions		===== Wetter =====>>		
Forecast Point	Forecast Period	=====		Chance Of Exceeding *		=====		30-Yr Avg. (1000AF)
		90%	70%	50% (Most Probable)		30%	10%	
		(1000AF)	(1000AF)	(1000AF)	(% AVG.)	(1000AF)	(1000AF)	
GRANDE RONDE at Troy (1)	MAR-JUL	1137	1648	1880	128	2112	2623	1471
	APR-SEP	1006	1470	1680	128	1890	2354	1312
CLEARWATER at Spalding (1,2)	APR-JUL	4952	7522	8690	114	9858	12428	7618
	APR-SEP	5223	7944	9180	114	10416	13137	8052
SNAKE blw Lower Granite Dam (1,2)	APR-JUL	12927	20404	23800	110	27196	34673	21650
	APR-SEP	14582	22984	26800	110	30616	39018	24360

LOWER SNAKE RIVER BASIN
Reservoir Storage (1000 AF) - End of December

LOWER SNAKE RIVER BASIN
Watershed Snowpack Analysis - January 1, 1999

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
					LOWER SNAKE, GRANDE RONDE	11	179	134

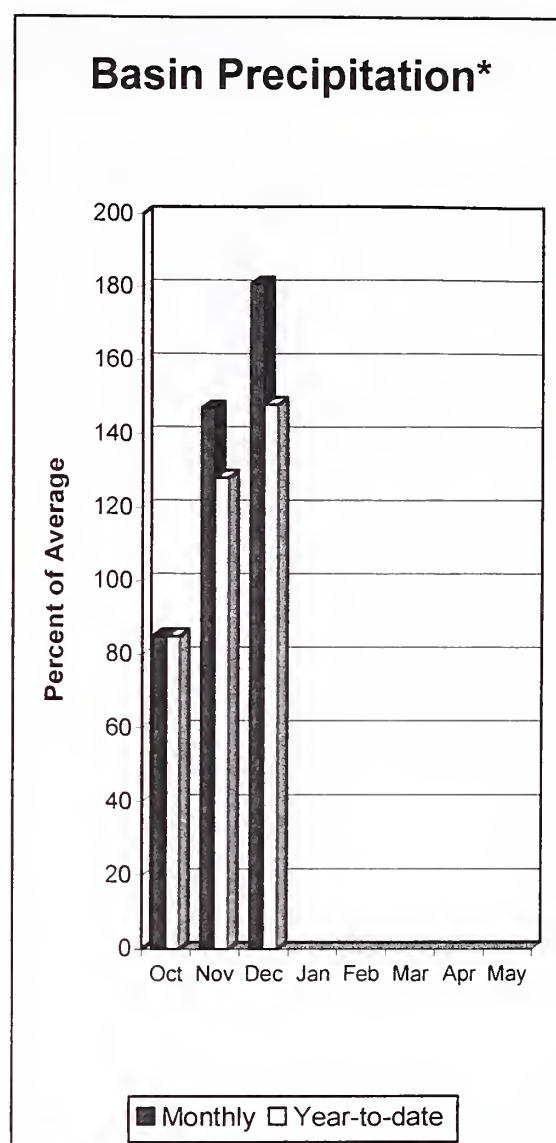
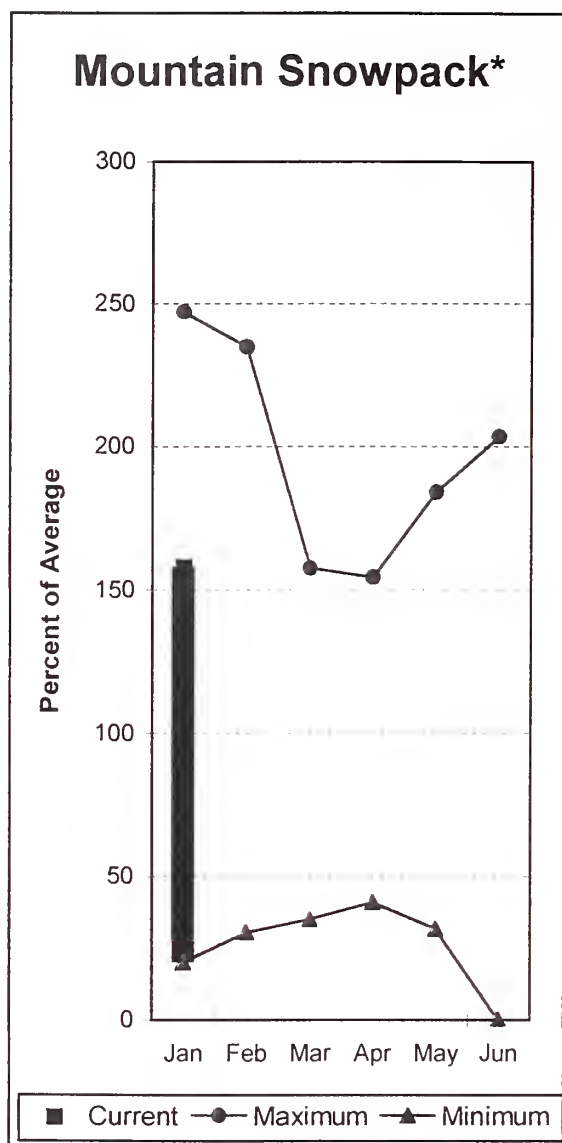
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

Cowlitz - Lewis River Basins



*Based on selected stations

The forecast for summer runoff in the Lewis River Basin is 114% of average. The forecast for the Cowlitz River at Castle Rock is for 115%, and the Columbia River at The Dalles is 109%, of average runoff. December streamflow for the Cowlitz River was 143% of average and 168% for the Lewis River. December precipitation was 181% of average, 148% of average for the water-year. January 1 snow cover for the Cowlitz River was 164%, and the Lewis River was 153% of average. The Paradise Park SNOTEL recorded the most water content for the basin with 407 inches of water. Average January 1 water content is 23.6 inches. Average temperatures were slightly below normal during December.

For more information contact your local Natural Resources Conservation Service office.

Cowlitz - Lewis River Basins

Streamflow Forecasts - January 1, 1999

Forecast Point	Forecast Period	<<===== Drier ===== Future Conditions ===== Wetter =====>>						30-Yr Avg. (1000AF)
		Chance Of Exceeding *						
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
LEWIS at Ariel (2)	APR-JUL	895	1082	1210	115	1338	1525	1053
	APR-SEP	1054	1248	1380	114	1512	1706	1206
	APR-JUN	778	955	1075	115	1195	1372	935
COWLITZ R. bl Mayfield Dam (2)	APR-SEP	1371	1912	2280	116	2648	3189	1970
	APR-JUL	1205	1678	2000	116	2322	2795	1731
	APR-JUN	1029	1434	1710	116	1986	2391	1477
COWLITZ R. at Castle Rock (2)	APR-SEP	2393	2790	3060	115	3330	3727	2667
	APR-JUL	2088	2435	2670	115	2905	3252	2325
	APR-JUN	1990	2288	2490	125	2692	2990	1995
KLUICKITAT near Glenwood	APR-JUN	106	128	142	129	156	178	110
	APR-SEP	138	165	183	131	201	228	140
COLUMBIA R. at The Dalles (2)	APR-SEP	78656	96128	108000	109	119872	137344	98982
	APR-JUL	67732	82658	92800	110	102942	117868	84760
	APR-JUN	54819	66895	75100	109	83305	95381	68925

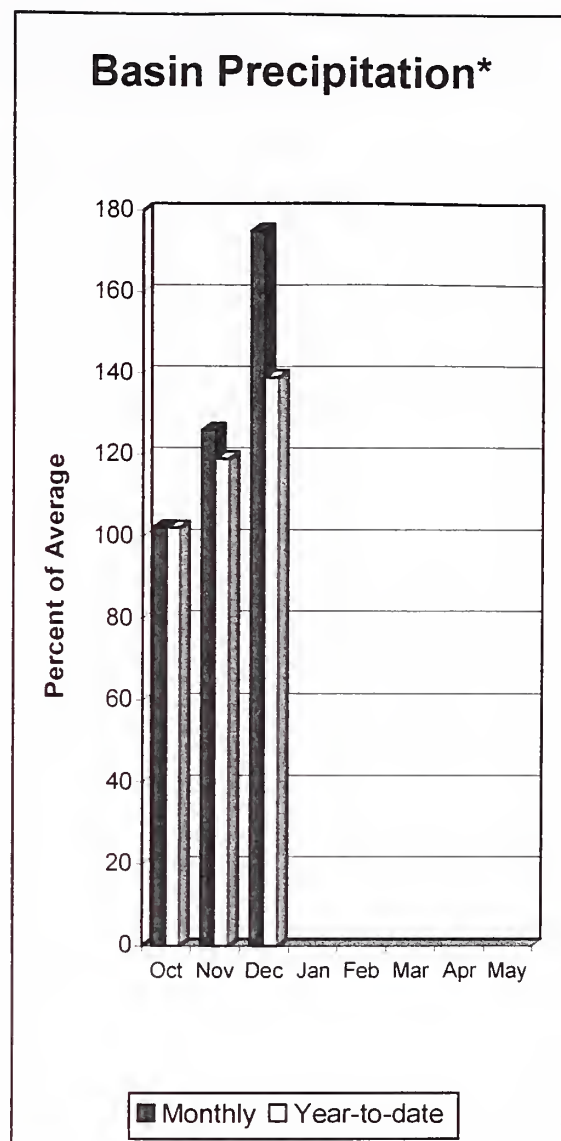
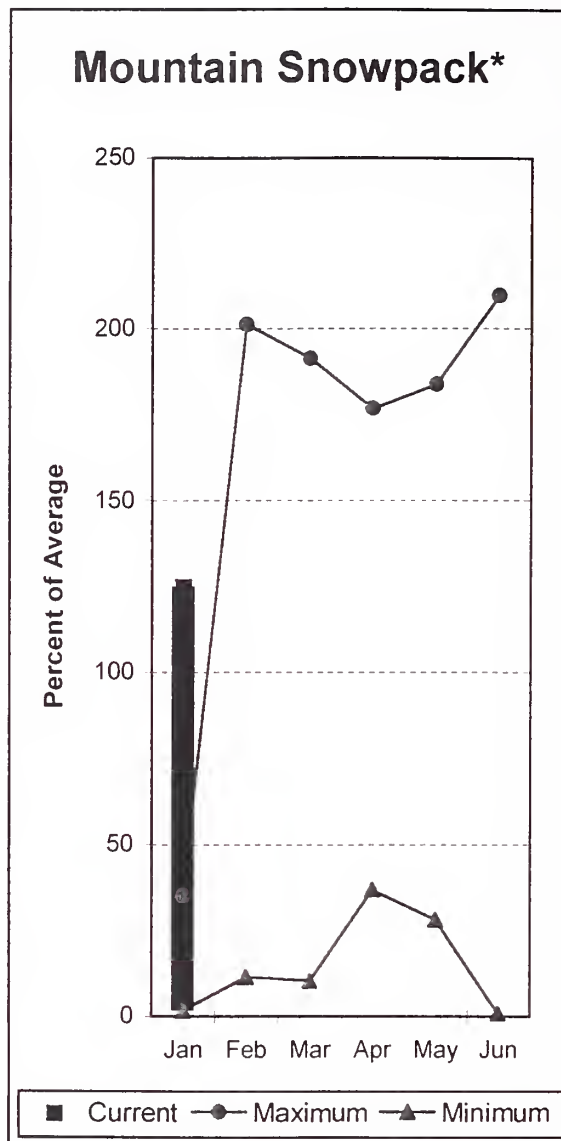
COWLITZ - LEWIS RIVER BASINS					COWLITZ - LEWIS RIVER BASINS			
Reservoir Storage (1000 AF) - End of December					Watershed Snowpack Analysis - January 1, 1999			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of Last Yr Average	
		This Year	Last Year	Avg				
					LEWIS RIVER	4	215	153
					COWLITZ RIVER	7	200	164

70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
 (2) - The value is natural flow - actual flow may be affected by upstream water management.

White - Green -Puyallup River Basins



*Based on selected stations

Summer runoff is forecast to be 116% of average for the Green River and 115% of average for the White River near Buckley. January 1 snowpack was 154% of average in the White River Basin; 154% in the Puyallup River Basin; and 76% in the Green River Basin. Water content on January 1 at the Corral Pass SNOTEL, at an elevation of 6,000 feet, was 21.3 inches. This site has a January 1 average of 13.5 inches. December precipitation was 175% of average, bringing the water year-to-date to 139% of average for the basins. Average temperatures in the area were slightly below normal.

For more information contact your local Natural Resources Conservation Service office.

White - Green - Puyallup River Basins

Streamflow Forecasts - January 1, 1999

		<<----- Drier ----- Future Conditions ----- Wetter ----->>						
Forecast Point	Forecast Period	Chance Of Exceeding *						30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
WHITE near Buckley (1,2)	APR-JUL	391	479	519	116	559	647	447
	APR-SEP	478	578	624	115	670	770	542
GREEN below Howard Hanson (1,2)	APR-JUL	208	272	301	117	330	394	257
	APR-SEP	239	302	331	116	360	423	285
	APR-JUN	186	246	273	117	300	360	234

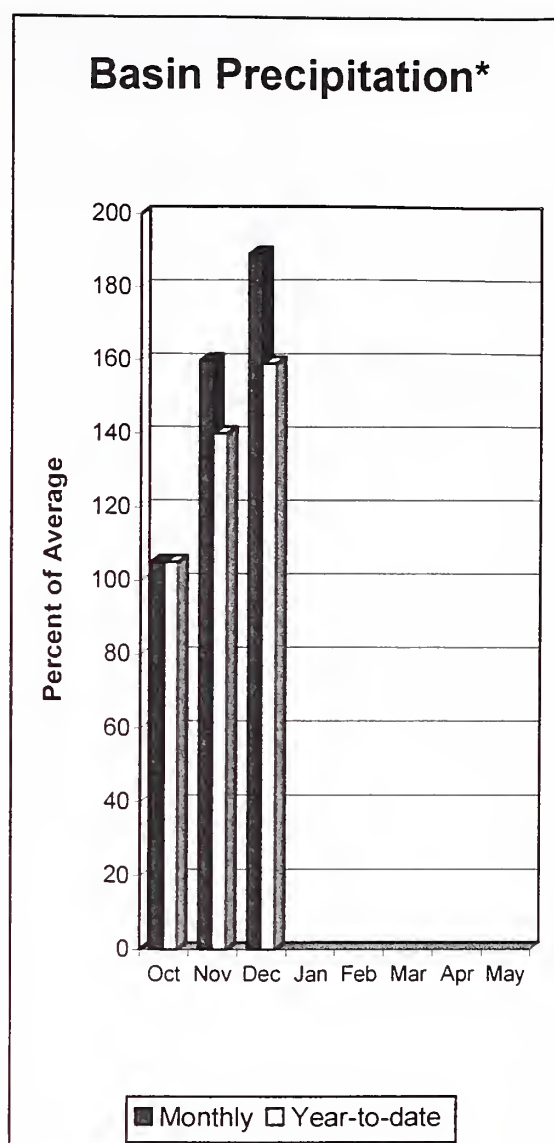
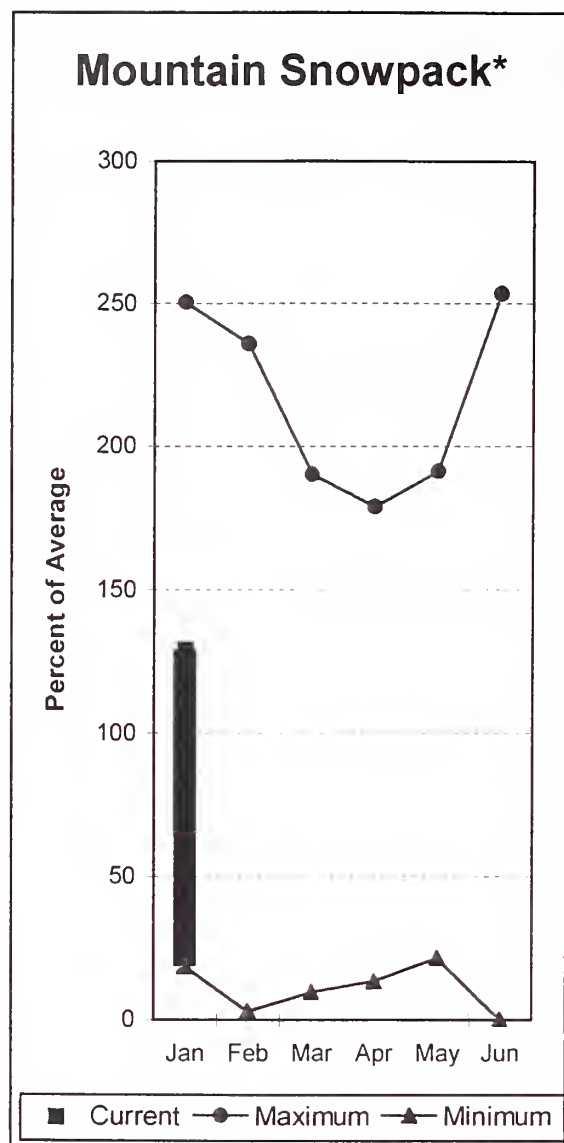
WHITE - GREEN RIVER BASINS Reservoir Storage (1000 AF) - End of December					WHITE - GREEN RIVER BASINS Watershed Snowpack Analysis - January 1, 1999			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
					WHITE RIVER	3	156	154
					GREEN RIVER	7	129	97

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

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 (2) - The value is natural flow - actual flow may be affected by upstream water management.

Central Puget Sound River Basins



*Based on selected stations

Forecast for spring and summer flows are: 118% for the Cedar River near Cedar Falls; 115% for the Rex River; 112% for the South Fork of the Tolt River; and 114% for the Cedar River at Cedar Falls. Basin-wide precipitation for December was 189% of average, bringing water-year-to-date to 159% of average. January 1 snow cover in the Cedar River Basin was 159%; the Tolt River Basin was 97%; the Snoqualmie River Basin was 133%; and the Skykomish River Basin was 135% of average. Stevens Pass SNOTEL, at 4,070 feet, had 23.3 inches of water content. Average January 1 water content is 15.3 inches. December temperatures were near normal.

For more information contact your local Natural Resources Conservation Service office.

Central Puget Sound River Basins

Streamflow Forecasts - January 1, 1999

		<<===== Drier =====		Future Conditions		===== Wetter =====>>		
Forecast Point	Forecast Period	=====		Chance Of Exceeding *		=====		30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
CEDAR near Cedar Falls	APR-JUL	63	79	91	118	102	118	77
	APR-SEP	71	88	100	118	111	128	84
	APR-JUN	59	71	80	118	89	101	68
REX near Cedar Falls	APR-JUL	20	27	31	115	36	42	27
	APR-SEP	23	30	35	115	40	47	30
	APR-JUN	19.3	25	28	115	32	37	25
CEDAR RIVER at Cedar Falls	APR-JUL	48	75	93	113	111	138	82
	APR-SEP	47	76	95	114	114	143	83
	APR-JUN	54	76	91	114	106	128	80
SOUTH FORK TOLT near Index	APR-JUL	13.2	15.4	16.9	111	18.4	21	15.2
	APR-SEP	15.7	18.3	20	112	22	24	17.8
	APR-JUN	11.5	13.4	14.7	112	16.0	17.9	13.1

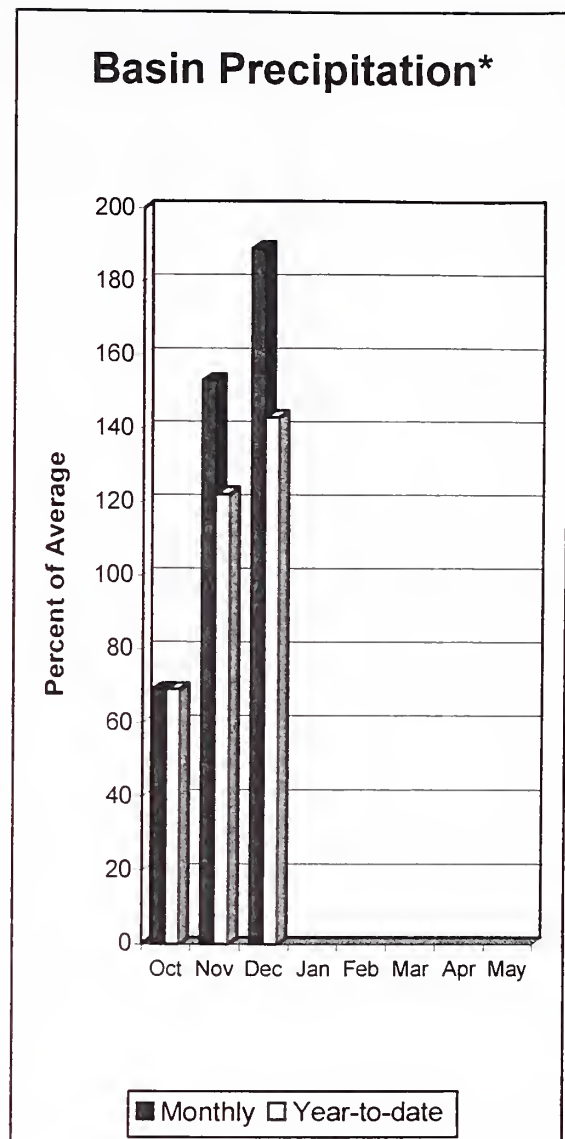
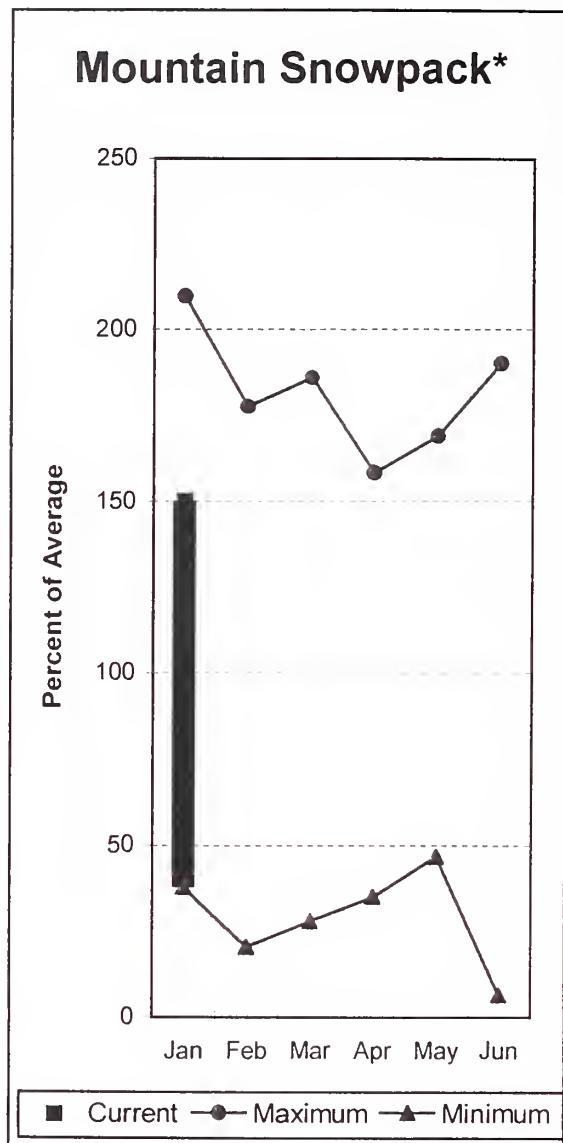
CENTRAL PUGET SOUND RIVER BASINS Reservoir Storage (1000 AF) - End of December					CENTRAL PUGET SOUND RIVER BASINS Watershed Snowpack Analysis - January 1, 1999			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of Last Yr Average	
		This Year	Last Year	Avg				
					CEDAR RIVER	4	193	159
					TOLT RIVER	2	145	97
					SNOQUALMIE RIVER	5	188	133
					SKYKOMISH RIVER	3	187	135

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

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- (2) - The value is natural flow - actual flow may be affected by upstream water management.

North Puget Sound River Basins



*Based on selected stations

Forecast for the Skagit River streamflow is for 112% of average for the spring and summer period. December streamflow in the Skagit River was 120% of average. Other forecast points included the Baker River at 115%; and Thunder Creek at 111% of average. Basin-wide precipitation for December was 181% of average, bringing water-year-to-date to 143% of average. January 1 snow cover in the Skagit River Basin was 171%, and the Nooksack River Basin was 135% of average. Data for the Baker River Basin was not available. Rainy Pass SNOTEL, at 4,780 feet, had 27.9 inches of water content. Average January 1 water content is 15.4 inches. January 1 Skagit River reservoir storage was 139% average and 77% of capacity. Average December temperatures were near normal for the basin.

For more information contact your local Natural Resources Conservation Service office.

North Puget Sound River Basins

Streamflow Forecasts - January 1, 1999

		<<----- Drier ----- Future Conditions ----- Wetter ----->>						
Forecast Point	Forecast Period	Chance Of Exceeding *						30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
THUNDER CREEK near Newhalem	APR-JUL	225	245	258	112	271	291	230
	APR-SEP	325	348	364	111	380	403	328
	APR-JUN	132	153	167	112	181	202	149
SKAGIT at Newhalem (2)	APR-JUL	1884	2016	2105	112	2194	2326	1879
	APR-SEP	2186	2345	2454	112	2563	2722	2191
	APR-JUN	1450	1557	1630	112	1703	1810	1455
BAKER RIVER near Concrete	APR-JUL	794	893	960	115	1027	1126	836
	APR-SEP	1037	1148	1224	115	1300	1411	1064
	APR-JUN	571	649	702	115	755	833	611

NORTH PUGET SOUND RIVER BASINS Reservoir Storage (1000 AF) - End of December

NORTH PUGET SOUND RIVER BASINS Watershed Snowpack Analysis - January 1, 1999

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
ROSS	1404.1	1086.9	1157.0	783.9	SKAGIT RIVER	3	170	166
DIABLO RESERVOIR		NO REPORT			BAKER RIVER	0	0	0
GORGE RESERVOIR		NO REPORT			NOOKSACK RIVER	2	219	135

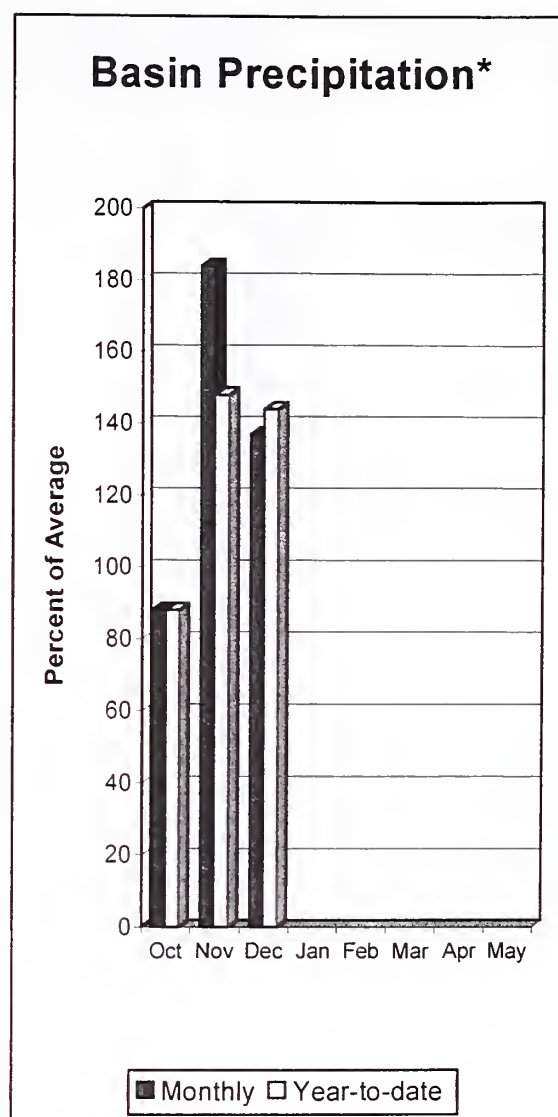
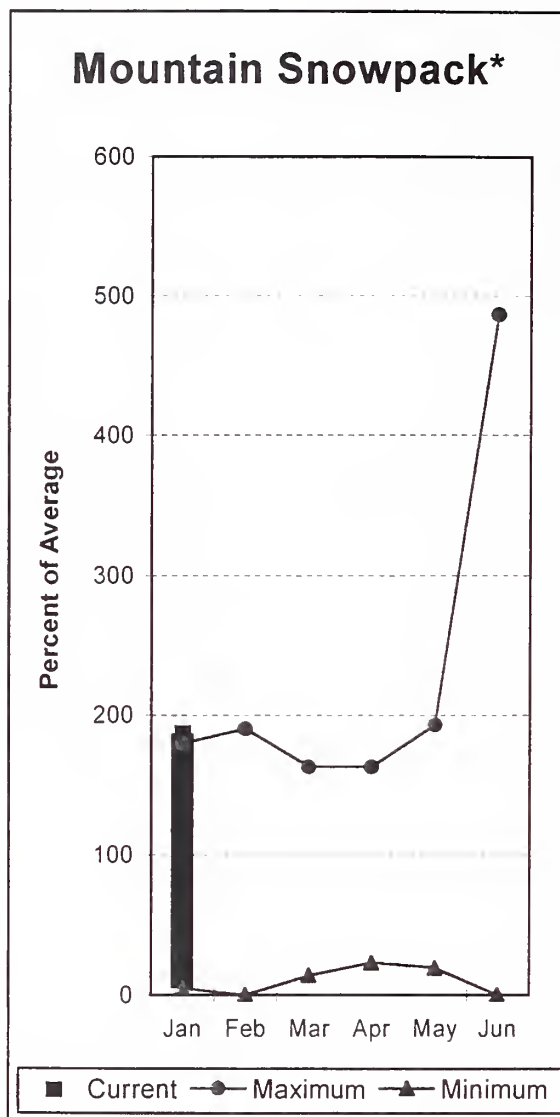
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

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(2) - The value is natural flow - actual flow may be affected by upstream water management.

Olympic Peninsula River Basins



*Based on selected stations

January forecasts of runoff for streamflow in the Dungeness River Basin are 104% of average and 110% of average for the Elwha River. The Big Quilcene and Wynoochee rivers can expect near to above average runoff this summer also. December precipitation was 137% of average. Precipitation has accumulated at 144% of average for the water year. December precipitation at Quillayute was 21.47 inches. The thirty-year average for December is 14.62 inches. January 1 snow cover in the Olympic Basin was at 187% of average. The Mount Crag SNOTEL near Quilcene had 21.1 inches of snow-water-equivalent on January 1. Average for this site is 11.3 inches. Temperatures were slightly below average for the month.

For more information contact your local Natural Resources Conservation Service office.

Olympic Peninsula River Basins

Streamflow Forecasts - January 1, 1999

Forecast Point	Forecast Period	<<----- Drier -----		Future Conditions		----- Wetter ----->>		30-Yr Avg. (1000AF)
		90%	70%	50% (Most Probable)		30%	10%	
		(1000AF)	(1000AF)	(1000AF)	(% AVG.)	(1000AF)	(1000AF)	
DUNGENESS near Sequim	APR-SEP	118	142	159	104	176	200	153
	APR-JUL	97	117	131	105	145	165	125
	APR-JUN	74	89	99	105	109	123	94
ELWHA near Port Angeles	APR-SEP	419	504	562	110	620	705	510
	APR-JUL	353	421	467	110	513	581	424

OLYMPIC PENINSULA RIVER BASINS Reservoir Storage (1000 AF) - End of December

OLYMPIC PENINSULA RIVER BASINS Watershed Snowpack Analysis - January 1, 1999

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
					ELWHA RIVER	0	0	0
					MORSE CREEK	0	0	0
					DUNGENESS RIVER	0	0	0
					QUILCENE RIVER	1	301	187
					WYNOOCHEE RIVER	0	0	0

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

Basin Outlook Reports and Federal - State - Private Cooperative Snow Surveys

For more water supply and resource management information, contact:

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or

Scott Pattee

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How forecasts are made

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño / Southern Oscillation are used in computerized statistical and simulation models to prepare runoff forecasts. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertain the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less water.

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Natural Resources Conservation Service
Mount Vernon, WA

